THE INDIAN CONSERVATORY

AND

GUIDE TO ORCHID-GROWING.

BY

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Calcutta:

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PREFACE.

THIS little work, some Chapters of which have already appeared in the columns of the *Englishman*, professes to be nothing but a simple and practical brochure on the Construction, Stocking and Management of Indian Conservatories and Growing of Orchids.

The advice which it offers to Amateur Gardeners is based on several years' experience of the subjects treated on.

In the Chapters on Orchids, scientific descriptions have been purposely avoided, as popular descriptions accompanied by several plates of characteristic plants of the leading classes, will probably prove more useful to the amateur.

In describing some of the Orchids, Williams' *Orchid Growers' Manual* and Mason's *Burma, its people and productions* have been consulted.

The plates of Orchids, which are chiefly copied from the *Botanical Magazine*, were

reduced and adapted for this work at the Royal Botanical Gardens, through the kindness of Dr. Prain, the Officiating Superintendent.

The book is interleaved with blank pages for convenience in keeping notes, &c.

G. BARTON GROVES.

DACCA,

January 1889.

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THE INDIAN CONSERVATORY.

CHAPTER I.

CONSTRUCTION OF THE CONSERVATORY.

OF recent years, amateur gardening in India has become a very popular amusement. Many of our compounds are gay with flowers, and our verandahs with pot plants and foliage shrubs, but the general tendency of Europeans in India is to cultivate our home species, and the wide and interesting field of tropical flower gardening is considerably neglected. At a little cost, however, the amateur gardener could add to his collection many a "thing of beauty" from the plant world of India, and so enrich his collection. I have managed an Indian Conservatory, or, as it is sometimes called, a Betel House, for several years, and my experience may be of some value to others.

The site for the building should be in the open and not underneath trees, as the drip from the branches in the rains, and the falling of dead leaves in the dry season, are objectionable. The size and shape of the structure must be regulated by taste and conditions; and the material used for the framework of the building, iron, wood or bamboo, is a question of cost and durability. Many of us are not permanently placed in India, and it would often be folly to erect a heavy structure at considerable expense. To birds of passage I would recommend a bamboo house, say 18 or 20 feet long by 14 or 16 feet wide. The roof should be sloping, the ridge being 14 or 15 feet from the ground, sloping down on each side to nine or ten feet. Care should be taken to procure strong seasoned bamboos; those used for the posts and for the ridge of the roof should be stout, and those for the framework of the roof much lighter. If the posts and the framework of the roof are given a couple of coverings of coal tar, the house will last well for three years. The walls should be made of bamboo trellis, openings for doorways being left at convenient places. The trellised sides should be clear of

the ground by six inches, and also clear of the top, where the sides join the roof, by six inches. Creeping plants should be grown on the trellis, but they should never be allowed to surmount the trellis and climb on the roof. In selecting the creepers, do not choose gross and rampant varieties; among the most suitable are the Hoyas (wax plants), Stephanotis, Cissus discolor, the smaller varieties of Passifloras (passion flowers), the climbing fern and some of the smaller Ipomœas. The best, most durable, and neatest material for roofing is a coarse netting made of coir twine; this is much in vogue on the Bombay side, though scarcely known elsewhere. It is procurable from the Jail Depôt, Calcutta.

The next best thing for roofing is long elephant, or Moonj, grass, which must be thinly spread over the frame, so as to admit a chequered sunlight and a modified rain; it must be tied on with laths of bamboo. The leaves of the cocoa or of the toddy palm may also be used, of course tied on in such a way as to admit partial sun, or rain, but they are not tidy. Grass or palm leaves will want renewing at the beginning of each monsoon, whereas the coir netting is calcu-

lated to last for at least three years. In tying on the trellis, &c., only use split cane, or coir twine (both to be got at the Jail Depôt), as these two materials stand the monsoon without rotting. The floor of the house should be raised a few, say six, inches; and the best material for the floor is a depth of three or four inches of coal ashes, which material never gets sloppy in the rains, and, if thoroughly watered once or twice a day in the dry season, keeps the atmosphere in the house cool and moist. If these ashes or cinders cannot be procured, broken brick is the next best thing, and then gravel or small *kunkur*. Take care to have a drain round the house outside.

Rockeries are a favourite embellishment to an Indian Conservatory. They may be made of rough stones and rocks where procurable, but fused bricks, which can be got anywhere, answer admirably. Having selected the place where it is intended to make the rockery, mark it out and remove the soil to the depth of one-and-a-half inch, and fill up the space with slaked lime; the object of this is to keep insects away. The best soil for the rockery is a mixture of two parts leaf mould, one part common

loam, one part coarse sand. The same soil is suitable for Ferns, Begonias, and other delicate plants grown in pots. As you build up the rockery, fill in the spaces between the stones with the above soil, and water freely as you fill in, so as to consolidate the soil, and completely fill in the spaces. Take care that your rockery is clear of the wood work and trellis of the house.

In spite of every care and cleanliness, white ants will at times appear; but the best preventative is *kerosine oil,* prepared and applied in the following manner, the discovery of which is due to Mr. Ridly, of the Lucknow Gardens. Take a quart bottle and fill it one-third with milk, let it stand till the milk turns sour; then nearly fill the bottle with kerosine; let a cooly churn the mixture as cream is churned for butter; it will form a thick, white emulsion, which mixes freely when stirred into water. Use a sherry glassful of this emulsion to a kerosine tinful of water. Stir well, and water the whole of your Conservatory freely with it, out of a rose waterpot. It will not harm the most delicate plants. The floor and rockery should be saturated with this effective insecticide; and if this process be adopted every two months, white ants and

other pests will give your Conservatory a wide berth. The only plants likely to be injuriously affected by this kerosine compound are *orchids*, but as they are usually mounted on hanging blocks they are not likely to come in the way of the *mallee* in his general watering of the house.

Stands for pot plants should be made of wood and painted. Tubs and large flower-pots should not be placed directly in contact with the ground, but should stand on inverted bottles sunk to half their height in the soil.

Having described the manner of constructing the Conservatory, the next thing is a list of some of the most suitable plants with which to stock it. Among the best are Orchids, Marantas, Ferns, Palms, Canes, Begonias, Dracœnas, Dieffenbachias, Selaginellas, Alocasias, Anthuriums, Caladiums, Colei, Crotons, Fittonias, Hoffmanias, Nepenthes (Pitcher plants) Peperomias. In the North-West Provinces, the Punjab, and other localities where extreme heat prevails in the hot season and frost at night in the cold season, matting should be used on the roof and sides in the day time as a protection against the heat and at night against the cold.

CHAPTER II.

BEGONIAS.

Begonias are perhaps, about the most important class of plants suitable for Conservatory cultivation, since they comprise some of our choicest and most lovely foliage treasures. These plants are of two kinds, *viz.*, the perennial, which grow all the year round, and the tuberous, which die down after the rains and come up again the next monsoon.

The following selection of the perennial sorts is recommended as a beginning :—B. Rex, B. longifolia marmorata, B. Otto Forster, B. Queen Victoria, B. Prince of Wales, B. Apcareuse, or gigantea, B. Voie lactee.

These plants are easily propagated in the rains from single leaves in the following way:—Take a one-dozen wine case and fill it with coarse sand. Make holes in the sand with a smooth stick, and insert the entire stalk of each leaf into one of the holes, so

that the leaf itself lies flat upon the sand. The sand round the stalk should be pressed down so as to fill up the hole completely. Stand the box on four bricks in a corner of the Conservatory, or other sheltered situation, where the leaves will get plenty of light and fresh air, but *only the early morning sun.* In less than a month young plants will form. In the Rex, Queen Victoria and Voie lactee class the young plants always appear in the centre of the leaf, and often other plants form on the body of the leaf. In the Apcarense and longifolia marmorata class, the young plants are thrown up through the sand from the bottom of the stalk, and as the leaf does not die down, it is possible to cut off the young plant and propagate again, time after time, from the same leaf. Water the leaves every evening. When the young plants are a month old, they may be potted off.

The soil for Begonias is the same as was recommended for rockeries in the previous Chapter, *i. e.*, two parts leaf-mould, one part common loam, and one part coarse sand. A little old decayed cow's manure should be added; and in potting, great care should be taken to provide for very free drainage,

by mixing with the soil lumps of charcoal, and potsherds (broken flower pots are better than broken bricks). Great care should be taken to leave the top of the rhizome, out of which the leaves spring, exposed, since if it is covered up with soil it will rot, and you will lose your plant.

Of tuberous Begonias there is a very large and beautiful cold climate class cultivated at home, more for the sake of their beautiful flowers than for their foliage. This kind is not suitable for cultivation in the plants of India, but would be a great acquisition to amateur gardeners in the hills; a nice selection of some two dozen tubers can be got for ten shillings from any leading florist at home. They should be imported by the end of March, and started in pots, immediately they arrive. At the end of the rains in October, they should be allowed to die down and dry up. Then stow away the pots in a dry godown or cupboard, where the frost cannot penetrate. They should be started again the following April.

The result of an experiment with these Home Begonias, which the author tried in the plains, was that out of two dozen tubers, 18 grew and six blossomed, but the plants

entirely rotted off before the end of the rains. Many lovely tuberous Begonias are found in the hills in India, and with a little care the varieties collected from the lower ranges, (say 2,000 feet and below) can be grown in the plains. A very interesting field is open to the flori-culturist in the way of crossing the home varieties with the tropical ones; the result would be a fine class of new hybrid plants susceptible of cultivation in our Indian Conservatories.

Begonias ordinarily require watering once a day; but in very dry weather they should be watered twice, morning and evening. During the height of the rains, Begonias should be sheltered, or the foliage is apt to rot from the drip; it is well, therefore, to have one corner of the Conservatory roof completely thatched, or covered with a mat or piece of tarpaulin, and to keep the stand of Begonias underneath.

B. Apcarense or gigantea is a very noble plant, and soon grows too large for a flower pot; it should then be put into a tub. The author has had plants of this variety with leaves four and five feet high and 18 inches in diameter. In Calcutta, between 60 and 70 varieties of Begonias are in cultivation.

CHAPTER III.

FERNS AND SELAGINELLAS.

Our Indian Conservatories would be sadly deficient in beauty were it not for Ferns and Selaginellas; the former lend an air of grace and lightness, and afford many an exquisite contrast if judiciously interspersed among plants of heavier foliage; while many of the latter are invaluable for covering unsightly corners and crannies among the rock work, and for hiding the surface soil of large pots and tubs in which the Crotons, Dracœnas, and other ornamental shrubby plants are grown. The Maiden-hair (Adiantum) is the most numerous of our cultivated species; and of these the finest is A. Farleyense. It is a delicate plant unless properly managed. The best way to treat it is to sink the pot in which it grows into another pot two sizes larger, filling up the space in the larger pot with common soil; an uniformly moist atmosphere and entire absence of the direct rays of the sun are essential. All

the Maiden-hairs are the better of this treatment, except one or two indigenous kinds which are hardier, and will be referred to further on.

Other fine kinds are A. gracillimum, A. Peruvianum, A. scutum, A. tenerum, A. trapeziforme and A. Bausei. An important hint in cultivating Maiden-hairs, which should be carefully followed, is, never to cut off a *fading leaf or a leaf stalk*, until absolutely dead and dry. With Ferns, each succeeding frond is larger than its predecessor, and nature herself does much to hide the unsightly decaying fronds. The author believes, though he has never seen the theory advanced, that with many Ferns, as with Orchids, the new growth derives sustenance from the parts which are in process of decay. It is often necessary to train your plants when they are growing large by tying a frond here and there to a stick. These sticks should be made of bamboo, shaved down very thin, and the fronds should be tied to the sticks rather loosely, with a soft material such as darning cotton. This tying up is always necessary with A. Farleyense, as the leaflets are so large and the foliage so heavy that the stalks are

very apt to bend over with the weight and thus the plants lose much of their beauty.

The common smooth leaved Indian Maiden-hair which grows in the hills and in moist regions in the plains, and which is even found growing in old wells in the driest parts of India, is familiar to most of us. It is hardy, can be much improved by cultivation, and is well deserving of a place in the Conservatory. There is a very pretty rough leaved variety of Maiden-hair to be found in some parts of the plains growing on old walls and banks (there is plenty of it at Hughli); but this sort, unlike the rest of its kind, thrives in the blazing sun. It needs watering twice a day, and is bound to die down in places where hot winds prevail, to come up again during the rains. Some of the smaller Maiden-hairs grow well on boards, or on earthen *gurrahs* or *soroys*. To accomplish this, make a mixture of half loam and half leaf mould, with some broken moss. Wet it and mix it up and plaster it over the surface, then put some small plants upon it; cover with a layer of moss and bind the whole rather tightly down with fine copper wire. If water vessels are used, they can be kept filled with water, and

should be suspended from the roof of the house. The plants soon grow and cover the vessel or board and thus form a graceful and interesting addition to one's collection.

Among other sorts of Ferns the following are recommended as ornamental and not difficult of successful culture:—Gymnogramma calomelanos, a rather large growing Silver Fern; G. sulphurea, a Golden Fern of similar habit; also G. Sp: Darjiling, which is well known to our horticulturists as the Indian Golden Fern. Pteris cristata and P. ludens are both distinct and attractive. As are also Nephrolepis Duffii and N. furcans. Most of the numerous Ferns found in the Terai and the lower ranges of the hills will thrive in Conservatories; as also those foreign varieties which are grown in hot-houses in Europe, and which can be imported in Wardian cases, so as to arrive here early in the rains.

The soil for Ferns is much the same as recommended for Rockeries and Begonias in the previous Chapters, *viz.*, two parts leaf-mould, one part loam, and one part coarse sand, but a little old slaked lime should be added and a very small quantity of thoroughly decayed cow manure. Plenty

of drainage is necessary in the way of clean broken flower pots and lumps of charcoal which materials should be freely mixed up in the soil. Few Ferns require much room for their roots, so the pots selected should be small in proportion to the size of the plants. In potting, great care should be taken not to cover up with soil the crown of the plants, out of which the new fronds spring.

This Chapter would not be complete without a reference to Tree Ferns. Those which are found in the lower hills can be easily grown in our Conservatories; small plants should be selected. The middle of the rains is the best time to transport them. The larger fronds should be removed and the earth shaken off the roots; the plants will then travel long journies, if packed in a box with moss. Holes should be bored on all sides of the box, to admit of ventilation. When the Ferns are unpacked, leave them for a couple of days in a shady part of the Conservatory and water them, and then pot off in large flowerpots or tubs. Use the same soil as prescribed above; but bricks broken up into lumps, an inch in diameter, should be used for drainage; or

better still, lumps of cinder from a locomotive, or furnace, if procurable. Put a thick layer of the drainage at the bottom of the, pot, or tub, and place your Tree Fern on it and fill up carefully all round with a mixture of the soil and drainage material. In the Andaman and Nicobar Islands Ferns abound. The latter locality produces some three or four varieties of Tree Ferns, some of which, being doubtless, centuries old, have attained the height of 40 feet and over.

The Davallias, or Hare's-foot Ferns, are all graceful, and do well in hanging baskets filled with a mixture of moss and soil. Some kinds of these Ferns grow on the branches of trees without needing soil at all. The avenues and jungles of the Burma coast often present a lovely sight in the way of a tree with trunk and limbs clad in this Fern, which might, under those conditions, be aptly termed nature's lace. The Burma Davallias stagnate and lose their fronds after the rains, but there is a perennially green kind found in the Nicobars, which the author thinks might be introduced into our Conservatories with much advantage.

Ferns should be watered twice a day in dry weather and uniform moisture should

be kept up in the house. All Ferns are sensitive to sudden changes of temperature, and the author has seen more than one of his treasures absolutely killed in a night through its removal from the moist Conservatory to a dry, heated drawing or dining room, to which it was inconsiderately taken as a table decoration.

Selaginellas, also called Lycopodiums, are of two kinds, creeping and erect, and there is one variety, commonly called the Metallic Fern, which is a regular climber, and which is well adapted for covering the trellis sides of the Conservatory. The following erect kinds are easy to grow and very ornamental :—S. Africana, S. bellula, S. Brownii, S. Sp. Singapur, and S. Wallichii. There are many sorts of the creeping variety to be found in the hills and in moist localities in the plains, and they are all hardy and quick growing.

Ferns can be propagated by the division of the roots; they can also be grown from spores (*i.e.* the seed). The following plan is recommended for growing from spores :—Take a well shaped, porous brick, and on one of its sides scrape away the surface to about one-eighth of an inch deep, leaving

a rim unscraped all round the edges. This makes a miniature pan. Fill the hollow which has been scraped away with equal parts of coarse sand and leaf mould, powdered and passed through a fine sieve; press the soil down pretty tightly by means of a flat board, leaving the rim clean, and then sprinkle the spores over it. Now place the brick in a shallow pan of water, so that the top of the brick is one inch above the water, cover the pan with a pane of glass, and keep it in a dark corner of the Conservatory. When the seedlings show three or four leaves they should be tenderly transplanted into small pots and kept under glass until they make decided growth. The spores are very minute, and it is necessary to divide them before sowing; this is done by mixing a pinch of the spores with a little finely powdered dry earth. If the spores are sown too thickly, the seedlings will come up so close together that much difficulty will occur in the transplanting.

CHAPTER IV.

MARANTAS, ALOCASIAS, &c.

The Marantas form an important class of foliage plants for Conservatory adornment. The arrowroot of commerce, a native of the West Indies, belongs to this class; it is to be found occasionally in vegetable gardens near the coast, but, though its habit is graceful, it is hardly worth a place in the Conservatory. The florist's Marantas afford some of the loveliest variations of colour to be found in the vegetable kingdom. M. zebrina, with its velvety leaves of bright green, barred with dark bands, is very attractive. M. Kerchovei has small blunted leaves of pale green, with regular markings in deep brown on each side of the mid-rib, resembling a plum and a leaf; these markings are repeated from the base to the end of each leaf. M. regalis and M. undulata are both distinct; and other choice varieties are albo-vittata, Goveana, Leitzei tubispatha, Vanden Hickie, and

Hardingii. There are some 50 kinds to be had from the florists in Calcutta; and the Botanical Gardens boast of many a treasure of this class not yet sufficiently multiplied to admit of distribution. The author has met with grand varieties of this species in the coast jungles of Burma, attaining a height of ten feet.

Marantas flourish in the soil recommended in the previous Chapters, but will stand more manure; they require an inch or so of drainage at the bottom of the flower pot, and plenty of room for the roots, as they are rather rapid growers. One should aim at fine specimens, *i.e.*, large pots well filled with foliage.

Propagation is easily effected by division of the tubers towards the end of the rains. Marantas will not stand hot winds, and in localities where such prevail they should be allowed, on the approach of the hot season, to die down in their pots and then be removed to a dry place till the monsoon approaches, when they may again be started, unless a constantly moist atmosphere can be maintained in the Conservatory. In growing Marantas, care should be taken to cut out all dying leaves, as they detract greatly

from the beauty of the plants. They are essentially shade and moisture loving.

Caladiums, Alocasias and Colocasias are allied in habit. The first are natives of tropical America, while many varieties of the latter are found in the East. Being tuberous rooted, they can be imported with ease, by parcel post, before the rains. There are so many varieties in cultivation that the amateur gardener is recommended to make a small remittance to a Home, or an Indian florist, and trust to him for a varied selection. The soil should be four parts loam, one part coarse sand, one part leaf mould, and one part well-decayed cow's manure. Mix small lumps of charcoal with the soil, and give plenty of drainage at the bottom of the flower pots. Many persons grow these plants all the year through, but this system often leads to the degeneration of the plants, which in their natural habitats, die down in the dry season. They require free watering and a good deal of light; if kept too much in shade the leaves grow spindly and lack colour. Many pretty varieties of Alocasias and Colocasias are to be found in the Terai and lower hills, also along the Burma coast.

Dieffenbachias and Dracœnas are stately and striking plants, and thrive well in the soil which has been recommended for Caladiums. They need light, and the modified and chequered sunshine which the Conservatory affords. Of the Dieffenbachias, nobilis, nebulosa, Bowmanni, picta, and Bausei form a good selection, and of Dracœnas, Guilfoylei, hybrida, Imperialis, nigricans, Shepherdii, and Verginalis. Many other varieties are in cultivation, and are procurable in Calcutta. These plants are handsomest in their middle growth, and when they grow so old as to become lanky the way to treat them is cut the stalk down, to cut off the head with a few inches of the stalk, and plant it (it soon roots without dropping the leaves), and then the remaining portion of the stalk should be cut into lengths of about two inches each (taking care that each section has two "eyes"), and, planted in flower pots, they speedily root, and form attractive plants in a few months.

Anthuriums are highly ornamental, and no Indian Conservatory should be without them. A. crystallinum is strikingly beautiful with its large heart-shaped leaves of

vivid green, ribbed with a net-work of crystalline white. A. Andreanum is remarkable for its brilliant scarlet flower spathes, which last for two or three months. Other good kinds are insigne, splendidum, triumphans, and Warocqueanum. The soil suited for Begonias is recommended for Anthuriums. Their propagation is effected by division, also by seed, and by cutting off and planting the bottom of the tap root. These plants are rather large growers, and need room to show off their exquisite beauty, so that many are not necessary, except in a large Conservatory.

The Asparagus family furnishes us with two pretty varieties, *viz.*, A. plumosus, a small growing evergreen pot plant with delicate feathery foliage; and A. racemosus, a climbing variety, which is ornamental for covering the trellis work. The latter should be cut down at the commencement of the hot season; it then springs up with renewed vigour on the approach of the monsoon.

Aralias are graceful shrubs, particularly A. Bernaysiana, A. Chabrieri, and A. Veitchii gracillima. They are propagated by cuttings, and need a light, rich soil.

CHAPTER V.

CULTIVATION OF CROTONS.

In Lower Bengal and other places where the climate is equable and free from hot winds on the one hand and from frost on the other, Crotons thrive very well in the ground and in pots and tubs placed in the veranda; but these choice foliage plants require care in other places, and the Conservatory is then the fitting place for them. The least touch of frosty air or hot winds is fatal to the beauty of the Croton, and, therefore, the plants should be grown in pots and tubs, so that they may be taken under shelter when necessary. Even in an equable climate, the choicer sorts are all the better for the extra care they get if kept in the Conservatory. Among these rank the following varieties: C. Alexandra, C. Imperatrice Eugenie, C. Indian Prince, C. Maharaja of Durbhunga, C. Prince of Wales, C. Princess of Wales, C. Sir Ashley Eden, C. Shepherdii and C. Little Gem. Among

the hardier Crotons the following suggestions are offered for starting a collection: C. Kingianus, C. magnolifolius, C. Williamsii, C. grande, C. ovalifolium are large leaved and large growing sorts, all very distinct; and the smaller varieties, named below, are beautiful, and all differ either in form or colouring:—C. Andreanus, C. Baron de Rothschild, C. cascarilla, C. Challenger, C. dayspring, C. eberneus, C. grotseque, C. Imperialis, C. interruptum, C. longifolium Australis, C. mutabilis, C. Neptune, C. rubro-marginata, C. Schomburkiana, C. spiralis, C. trilobus Lord Cairns, C. torquatus, C. Truffantianus, C. undulatum, C. Veitchii, and C. Youngii. This is by no means an exhaustive list, as there are upwards of 200 named varieties in cultivation in India.

The close of the rains is an excellent time for propagating Crotons, by means of cuttings; and the following procedure is recommended:—Trim your old plants judiciously, so as to improve their shape thereby; use a sharp knife for the purpose, and in each case make a clean cut; the prunings should then be cut into lengths of about four inches each, and all the lower leaves of each cutting

removed with a knife or pair of scissors, —leaving only a couple of leaves at the top of the cutting. Then spread out the cuttings in a shady, airy place, and leave them for a couple of hours before planting. It may be mentioned that the sap of the Croton contains a deal of *tannin*, which, combining with the iron of the knife, stains the fingers black; it is well, therefore, to use a pair of old gloves for pruning and for preparing the cuttings.

The soil in which Crotons grow quickest and best is rich and light, *viz.*, two parts well decayed cow's manure, one part good loam, half part leaf mould and half part coarse sand.

If you want shapely specimens, care must be taken in the training of the young plants. When each new shoot is two or three inches long, nip out the top of it; this will cause the shoot to branch. The process should be repeated with the new shoots when they attain two or three inches. In this way you will grow compact, well formed shrubs, instead of the straggling, unsightly bushes which one sometimes sees.

Repotting once a year, early in the rains, is desirable and moderate watering in the

dry season, during which the leaves should be frequently washed by means of a rose watering pot or a garden hose.

Crotons are apt to send out "sports," *i. e.*, a shoot appears with leaves quite distinct in form or colour from the parent plant. Such freaks should be carefully watched, and when the "sport" is large enough, it should be removed and put down as a cutting. Many new varieties of Crotons have had their origin in "sports" of this nature. Other new sorts have been the result of hybridizing; but except near the coast, the Croton does not often produce seed, though it frequently sends out its insignificant green flowers. The flowers appear on a short stalk, several on each; the male flowers are tufts, resembling the flowers of the *Babool* (Mimosa) and the Sensitive plant, with minute pollen at the ends of the filaments; the female flowers are very small, each having four tiny petals which open out flat when the flower is mature. To hybridize, one of the mature male blossoms should be picked off, and the pollen well rubbed into the open mature female blossom of another variety. When it is apparent that the seed is forming, a small muslin

bag should be tied over the female blossoms, the reason for this being that, when the seed is ripe, the pod opens and the seed scatters. The seed should be sown as soon as possible after the pod opens.

To those who have time at command, and who care for horticultural pursuits, hybridizing is a fascinating amusement, and is often attended with charming results in the way of new varieties.

Crotons are liable to attacks of blight insects. These pests can be easily removed by washing the leaves with the kerosine emulsion described in a former Chapter. The application can be made with an old sponge. The insecticide given at the end of Chapter VI. is the best for scale.

GUIDE TO ORCHID-GROWING.

CHAPTER VI.

EPIPHYTAL ORCHIDS.

Orchids are of two classes, *viz.*, those which grow on trees or rocks, which are termed Epiphytal; and those which grow in the ground and are called Terrestrial. In considering the treatment of these plants we will deal with the former class, the Epiphytal, in this Chapter.

They have a season of growth, when they make new roots, leaves and pseudo-bulbs (as the stalks and bulbous formations of some varieties are called); this season is the rains,—during which time it is fatal to remove or transplant them.

In the dry season they are "at rest," and can be moved and sent long journies without injury, if properly packed.

The best time for collecting them from the jungles is a month after the rains have

ceased; but they may be collected, without risk of injury, till the rains are nearly on again; care should be taken to bruise and disturb the roots as little as possible, when removing the plants from their native habitat. If to be sent on a journey, pack them tightly enough together that they will not shake about in the box, which should have holes bored with a centre-bit on all its sides. If the Orchids are to be sent by sea, dry moss should be packed among the plants, and small pieces of perforated zinc, or tin, nailed inside the box over each of the holes provided for ventilation, the object of this being to prevent cockroaches and other vermin getting into the box. During a voyage, the case containing the Orchids should be so placed on board the ship that it will be safe from the reach of salt water and of the heat from the engine room, and at the same time it should be in the air and not stowed away in the hold. The best time to send Orchids from India to Europe is early in March.

Most varieties blossom at the beginning of the hot season.

On receiving a batch of freshly collected, or imported Orchids, the plants should be

well looked over and all leaves, roots and pseudo-bulbs, which are completely dead and dry, should be cut out with a pair of scissors. It should always be borne in mind that the new growth of Orchids is supported by those old portions of the plant which are in process of decay; and when trimming and tidying your plants, never remove any portion which is not absolutely dried up and dead. When the plants have been thus trimmed, carefully clean each leaf and stem with water and a little soap, applied with a soft sponge; then spread the plants out singly in a cool, airy, shady place, for three or four days, during which time they should not be watered.

Experience has proved that the best way in India to grow most of the Epiphytal Orchids is to establish them in pots, or baskets, in a mixture of equal parts of charcoal and well-baked brick, broken into lumps. Cleanliness in the cultivation of Orchids is a *sine quâ non*, therefore take care that the pots, charcoal and bricks are all clean and sweet. If the pots are to be hung up, shallow ones are best; but ordinary flower-pots do well enough if the plants

are to be placed on stands. The hanging pots should have three or four small holes drilled just below the rim; they can then be easily suspended by means of copper, or other flexible wire. For very large plants, which require large pots, it is well to place a smaller pot, inverted at the bottom of the big pot, before filling up with the charcoal and brick; by doing this you use less of the potting material and render the large pot lighter to carry about.

Let the charcoal and brick be broken up in proportion to the size of the plant, *i. e.*, use coarse lumps for large plants and finer lumps for smaller plants.

In potting the plants, take care that only the roots, and no portion of the stems or pseudo-bulbs, are embedded. The potting material should be level with the rim of the pot and raised from one to three inches, according to the size of the plant and pot, in the centre.

Many of the larger Dendrobiums are difficult to keep erect in a pot, without support. The best way to treat these is to tie one or more of the stalks, or pseudo-bulbs, on to a neat piece of stick, or bamboo, in such a manner that the stick goes down to

the bottom of the pot, but the roots are left near the surface, so as to be just covered by the potting material. If the stick, or sticks, be held firmly in position while the pot is filled up, the plant will remain erect; and when the new roots form, they will so entwine themselves with the potsherds as to render the plant permanently fixed.

Orchids do not require frequent re-potting; once in two years will ordinarily suffice, and the best time to do it is just before the rains commence, that is, before the plant starts into new growth. When re-potting, cut away all portions of the plant which are completely dead and dry.

Rustic baskets can be economically made in the following way:—Select some straight sticks about the thickness of one's finger, remove the bark, cut them into equal lengths and drill holes in them about an inch from each end, thread the sticks on four pieces of flexible wire of equal length, in parallels, two and two (first one way and then across) until the basket is of the required height; then twist the four wires together to form the handle of the basket. Three or four sticks should be laid across the first parallels, to form the bottom of the basket.

Wire baskets, though very ornamental and suitable for Ferns, Selaginellas and numerous other plants, are not recommended for Orchids, as the metal absorbs heat and is likely to injure any portion of the plant which comes in contact with it.

Cocoanut fibre, moss and peat are generally objectionable for potting, in India, as they do not promote the growth of the plants, but tend to harbour insects and encourage mildew and rot.

Some of our Indian and Burma Orchids, notably the classes Vanda, Aërides, and Saccolabium, which send out large and vigorous roots, thrive better on blocks of wood than in pots. In selecting the blocks, take care to have hard, seasoned wood, not liable to rapid decay (teak is the best) and remove the bark. One or more iron staples should be driven into the block, whereby to hang it up. Old telegraph wire cut into suitable lengths, straightened out and hooked at both ends, is as good as anything for suspending the blocks. The iron staples should be painted with black japan, to prevent rust.

To mount an Orchid, place it in a natural position against the block, make your *mallee* hold it so while you spread out the

roots on the surface of the block and tie them down either with fine coir twine or the outer surface of cane, split thin and steeped in water to render it pliant. These two materials will not rot during the rains.

The method followed by some of entirely binding up the roots on the block, with twine or rope, is bad, as it encourages insects, which prey on the roots, and also excludes air from the roots,—without which Orchids cannot thrive.

If Orchids can be procured in considerable quantities, a very effective way to grow them is to mount a lot of the same sort on a miniature tree, thus; select a branching branch of a tree, from five to seven feet long, cut off the branchlets and the thin extremities of the branches (of which there should be three or four); then remove all the bark and fix the trunk, in an upright position, on a foot formed of two boards, three feet long, four inches wide and four inches thick, mortised cross-ways; nail or screw four battens, one inch square, on to the foot and on to the trunk, to keep the latter firm The foot should have a couple of coatings of coal tar, to keep insects away. If preferred, the miniature tree can be fixed in a tub, filled in with brickbats; the chief

objection to this arrangement is that the tree is more difficult to move about.

Dendrobium Pierardii, Dendrobium Aggregatum, Venda Roxburghii, Aërides odoratum and many other varieties, which, where they grow, are generally found in profusion, do admirably if mounted on miniature trees; and the effect of a mass of plants, all of the same kind, in bloom together, is very striking. The trees can, at will, be removed to the house veranda, or drawing-room, when the plants are in blossom.

It is useless attempting to cultivate in the plains Hill Orchids which grow at an altitude above 8,000 feet. They will probably blossom the first season, but then either die off at once, or dwindle away by degrees.

In the Hills, tropical Orchids can be grown in glass Conservatories, suitably heated and managed. Amateurs living in the Hills who wish to cultivate tropical Orchids, cannot do better than follow Williams' *Orchid Growers' Manual.*

In Lower Bengal, Lower Burma, along the Eastern and Western Coasts of the Peninsula, and in fact wherever the climate

is free from hot winds and frost, the Indian Conservatory, as described in the first Chapter, will suffice for successfully growing a large proportion of tropical Orchids.

Where hot winds prevail in the dry season, and frost occurs in the winter, special precautions must be taken to keep the atmosphere of the Conservatory moist and cool in the hot weather, and secure against frost in the winter. For the latter, matting up the house at night would, at most Indian stations, suffice. When the cold is severe, one or two kerosine lamps might, with advantage, be kept burning in the house, during the night. In the hot season the roof and sides of the Conservatory should be well matted up and a large *khus tattie* placed in the middle of each side of the house and kept constantly wet; the floor (made of cinders) must, at this season, be saturated with water twice a day; and the Orchids themselves syringed once a day before they blossom, and twice a day afterwards; where hot winds are very severe and last a long while, a glass house is undoubtedly the best for Orchids; the roof should be shaded with mats during the day.

From the middle or end of May until

the middle or end of October, the plants should be growing and must then be thoroughly watered morning and evening; when it rains heavily, watering is unnecessary; during the rest of the year a slight syringing every morning is sufficient, when a plant is in blossom, almost stop watering, and on no account let water touch the blossoms, or they will rapidly fade. Rain, tank, or river water is the best for Orchids.

For watering Orchids in a small Conservatory, a good brass garden syringe, with a rose, answers well; but for a larger house, a lever-handled aquaject is recommended.

Orchids are slow growing plants, and their propagation by amateurs would be found a tedious affair. In most cases, seedling Orchids take several years to arrive at such maturity as to blossom. This branch of Orchid cultivation is better left with the professional Orchid growers of Europe than followed by Indian amateurs. Again, it is better to aim at growing a few fine large masses of Orchids, instead of cutting the plants up to increase the number of specimens.

Cleanliness is, as before observed, a *sine quâ non* in the culture of Orchids. During

the rains, the plants will rarely, if ever need washing; but in the dry season, especially in towns and other dusty localities, the leaves should be carefully washed every week with water and a little soap, by mean of an old soft sponge. This treatment is also very beneficial in keeping away many of the insect pests to which Orchids, as well as other plants, are a natural prey.

Among the insects which are likely to give trouble, the larger sorts are cockroaches, woodlice, snails and grass-hoppers of sorts; and it will be found very useful, to keep them under, to encourage two or three toads, tree-frogs, and small lizards, in the house.

Ants of all sorts will not get the upper hand if the kerosine emulsion is regularly applied to the floor, rockeries and flower-stands, as advised in Chapter I. Sometimes, however, ants will make a determined set at a particular Orchid pot, or block. When this occurs, simply immerse the pot or block, plant and all, in a tub of water, out side the house, until the ants float to the surface.

The following recipe, especially recommended by Mr. Williams for white scale,

will be found generally successful with the Orchid blights which occur in this country:—To one gallon of rain, tank, or river water add eight ounces of soft soap, one ounce of tobacco and three table-spoonfuls of spirits of turpentine; stir well together and leave the mixture for forty-eight hours, then strain it through a cloth when it will be ready for use. It is necessary to rub the plants over two or three times if they are much infested, but once will be sufficient in most cases. It should remain on the plants for twelve hours and then washed off with water. What remains of the mixture can be bottled off for future use.

CHAPTER VII.

DESCRIPTIONS OF SEVERAL EPIPHYTAL ORCHIDS AND THEIR TREATMENT.

In this Chapter some of the most attractive and easily grown Epiphytal Orchids are briefly described. A note as to the best way of establishing the variety (*i.e.* on blocks, or miniature trees, or in pots or baskets) will follow each description.

DENDROBIUM.

India and Burma are very rich in this genus, which comprises some of the most magnificent flowering varieties known. Some sorts have erect, or semi-erect, jointed stems—such as D. superbiens (see the potted plant in plate). Others have jointed stems, but are quite pendant, such as D. Cretaceum. (See plate). Others again have stems resembling bulbs, such as D. aggregatum. (See plate).

D. Pierardii.—Pseudo-bulbs thin, round and pendant, in good specimens three to six feet long. Leaves fall before the flowers appear. Flowers pale pinkish-mauve with pale cream coloured lip. Nearly the whole

stem is covered with flowers, which grow in alternate pairs from the joints. Establish on a miniature tree, or on a pole four or five feet long, suspended horizontally. Common in Lower Bengal, Assam, Burma and the Terai.

D. Devonianum.—In form resembles D. Pierardii, but smaller, and has very slender stems. Flowers rich pinkish-purple with white and orange lip. This Orchid is best grown in a basket, with a very little moss about the roots. It requires copious watering during the season of growth. Native of Assam and Upper Burma.

D. Parishii.—Similar in habit to the foregoing, but the pseudo-bulbs are shorter and thicker. Flowers red-purple. Grow in basket. Native of Lower Burma.

D. cretaceum.—(Plate). Pseudo-bulbs round, succulent and pendant, in fine specimens a foot in length. Flowers white and yellow. Grow in basket. Native of Lower Burma and Assam.

D. crepidatum.—(Plate). Similar in form to D. cretaceum. Flowers much larger, white edged with pink and lip tinged with yellow; sweet-scented. Grow in basket. Native of Burma, Chittagong and Assam.

D. superbiens.—(Plate). Stems erect, jointed and thick. Flowers, in a spray, dark purple, they last several weeks in beauty. Grow in hanging pot, near the roof of the house, as the plant likes plenty of light. Habitat, Torres Straits.

D. formosum.—In form like D. superbiens but not so erect; evergreen; stems vary in length from a few inches to one and a half foot. Flowers, three to five inches across, in a spray, white, with bright yellow bar running down the lip. Grow in hanging pot. Native of Lower Burma, Sylhet, and to be found in the Ranchi District of Chota Nagpur.

D. secundum.—(Plate). Very like the two preceding, but the stems are thinner, Flowers small and crowded, often in the form of a tooth-brush, colour reddish-purple with yellow lip. (See Plate). Grow in pot. Native of Arakan. There is a very rare white variety.

D. moschatum.—Pseudo-bulbs the thickness of the little finger, jointed, those of recent growth erect, the older bulbs bend downwards, and are partially pendant. Fine plants, four to six feet long. Flowers three to three and a half inches across, eight to ten

on a spray; colour creamy buff, suffused with rose, lip yellow with two dark purple blotches. Has a musky scent. Grow in common pot. Native of Assam, Burma, the Eastern Ghâts and Terai.

D. moschatum cupreum.—Similar to the foregoing, but the flowers are apricot yellow, and lip golden yellow with two orange spots. Smells stongly of rhubarb.

D. fimbriatum.—(Plate). Similar in form to D. moschatum, but of smaller growth. Flowers in drooping sprays, bright yellow with lip of a darker shade and beautifully fringed. Grow in hanging pot. Habitat, Burma, Assam, Chittagong, the Terai.

D. fimbriatum oculatum.—Similar in form, but often grows larger. Flowers orange with large dark blot on the fringed lip. Grow in pot. Habitat, same as D. fimbriatum. A small variety of this Orchid is found in the Arakan Hill Tracts, having a perfume of Vanilla.

D. Dalhousieanum.—Similar in form and growth to D. moschatum; the new pseudo-bulbs are pencilled with dark purple lines. Flowers three inches across, in sprays, colour creamy white with two crimson-purple blotches in the lip. Grow in large pot and

give plenty of light as the hot weather is setting in. Native of Burma.

D. nobile.—Similar in style of growth to D. superbiens, the erect pseudo-bulbs are furrowed and from one to one and a half foot long. Flowers two or three in a cluster, white edged with pinkish-purple, the lip, which is rolled up at the base, having a crimson purple blotch. Grow in pot. Widely distributed in India.

D. McCarthiæ.—(Plate). Thin stems, bulbous at the base. Flowers bright pink. Grow in pot or basket, with a little moss. Water liberally during the season of growth. Native of Ceylon.

D. barbatulum.—(Plate.) Pseudo-bulbs erect and jointed, flowers in sprays, white with the spur of the lip greenish. Grow in hanging pot. Habitat, the Western Ghâts.

D. Fytchianum.—(Plate.) Similar in form to D. barbatulum, but the stems are thinner. Flowers eight to ten on a spray; there are two varieties, one pure white with rose coloured eye; and another pink with same coloured eye. Grow in hanging pot or basket. Native of Lower Burma.

D. albo-sanguineum.—Pseudo-bulbs from a few inches to a foot high, thick, erect and knotty. Flowers in clusters of two to six, cream coloured with two blood-red blotches at the base of the lip. Grow in hanging pot, near the roof and give plenty of direct sunlight in February and March, otherwise the plants will not bloom well. Habitat, Lower Burma.

D. aggregatum.—(Plate). The pseudo-bulbs are bulbous in appearance and very much crowded together, each bulb having a single leaf on the top. Flowers in sprays, yellow, with lip of deeper colour. Found in Chittagong, Burma and Assam. Grow in baskets or on miniature tree.

D. Jenkinsii.—Very like D. aggregatum, but much smaller, colour deep yellow. Grow on block. Native of Assam and Burma.

D. chrysotoxum.—Pseudo-bulbs club shaped, thin at the root; three or four ever-green leaves at the top of the bulbs; flowers, in a spray, rich yellow with orange lip, the latter being fringed. Natige of Burma and Chittagong.

D. Farmeri.—Pseudo-bulbs erect, club-shaped, and four sided, two to eight inches in length, evergreen leaves on the top of the bulbs. Flowers, in drooping sprays,

colour pinkish white, lip pale yellow with deeper tinge in the centre. There is a beautiful and not uncommon variety called aureoflavum, with bright yellow flowers and orange lip. Grow in hanging pot, or basket. Natives of India and Burma.

D. densiflorum.—Very like D. Farmeri in style, but the pseudo-bulbs are a foot or more in length, and neither so thick in proportion, nor so angular; they have several evergreen leaves at the top. Flowers in large drooping sprays, bright yellow and orange. Grow in common pot. Native of Assam, the Te ai and Burma.

D. thyrsiflorum.—Very like D. densiflorum, but of still larger habit. Flowers, white with orange lip, in large bunches. Assam and Burma.

There are numerous other Dendrobes, Natives of India and Burma which are grown and prized at Home, and which can be successfully cultivated in the Indian Conservatory, but space prevents further detailed descriptions.

AËRIDES.

These Orchids are evergreen, having for the most part thick, fleshy, curved leaves and straight, or slightly curved stems, with

profuse, strong roots growing out at right angles. The flowers are borne in gracefully bending sprays, and are as a rule sweet scented. In India they all do best on blocks, or on miniature trees if plants can be procured in sufficient number. In the dry season they require a more liberal supply of water than Dendrobes. In mounting them care should be taken that the heart of the plant is slanting and not quite perpendicular, because if water is allowed to lodge in the heart, it is very apt to cause rot and injury to the plant.

A. odoratum.—(Plate). A good specimen has three or four long, drooping stems, the thick fleshy roots being often above; leaves pale green. Flowers waxy white, tinged with violet, and the lip has a large curved spur and violet spots. Widely distributed throughout India. The following varieties of A. odoratum are also found in this country:—cornutum, flowers pink and white; majus, like A. odoratum but of larger habit; and purpurascens, which has broader and darker coloured leaves and flowers white, tipped with pink.

A. expansum Leoniæ.—Very like A. odoratum. but the flowers have brownish as

well as violet spots and the lip has nō spur. Native of Burma.

A. quinque-vulnerum.—Plant resembles A. odoratum; the flowers are white dotted with purple and the two petals, two sepals and labellum, or lip, are each tipped with deep purple. Philippine Islands, Manila and Borneo.

A. Emericii.—A lovely variety, found only in the Andaman Islands. It is a straggling plant with thin stems, profuse roots and small leaves; the flowers, waxy white and purple, grow crowded together on a drooping spray. Very sweet scented.

A. Lobii.—Leaves long, narrow and pendant and growing close together, instead of on a long stem. Flowers very closely crowded on a drooping spray, which is often branched; colour white and pinkish purple. Assam, Terai and Burma.

A. crispum.—(Plate). An erect growing species, sometimes four or five feet high; the stem is purplish and the leaves, five to ten inches long, dark green. Flowers, on a drooping spray, white, tipped with purple, with dark purple lip an inch long, three-lobed, the middle lobe being fringed. Very sweet scented. Native of Western India.

A. Fieldingii.—Height of plant two to three feet, broad fleshy two-lobed leaves. Flowers in drooping spray, often branched, white and rose, with deep rose lip. Assam.

A. vandarum.—(Plate). Very different in form from the preceding. It much resembles Vanda teres in appearance, the leaves being round. Flowers pure white with tinge of pink in the lip. Madras Presidency.

A. virens.—Some in form as A. odoratum, but flowers pale peach, spotted with purple and lip spotted with crimson. Java.

SACCOLABIUM.

This genus is also evergreen, but the plants are much more compact than the Aërides, they have thick leathery leaves and bear quantities of small flowers on a curved spray. They require plenty of light, and should be grown in hanging pots or baskets, near the roof of the house.

S. giganteum.—(Plate) A noble plant, leaves from two to three inches broad and eight inches to a foot long, having pencillings of darker green running lengthways; the stem is thick and sends out large vigorous roots. Flowers white, spotted with

purple and purple lip, and sweet scented, Burma. If this Orchid can be got in quantity, it makes a glorious object mounted on a miniature tree.

S. Blumeii.—Known in Burma as the "Cat's tail" Orchid, from the resemblance of the flower spray in shape to a Persian cats' tail. It has stiff, erect leaves about a foot long; pencillings of darker green lengthways along the leaves. Flowers very densely set on the stem; colour white, dotted with lilac spots. Hanging basket. Burma and Chittagong.

S. gutattum.—Same form as S. Blumeii, but a larger plant, the leaves being often a foot long, and not having the longitudinal pencillings. The flower spray resembles a Cat's tail; colour, waxy white, spotted with purple and purple lip. Widely distributed throughout in India and Burma.

S. ampulaceum.—(Plate). A small plant with stiff upright leaves, which are often covered with dark purple blotches. The flower spray is erect and sometimes branching, it bears numerous blossoms of a deep rose colour, which last a long time in beauty. There is a very fine form of this lovely Orchid found in the Tenasserim province of

Burma, named S. ampulaceum Moulmeinense. Native of Burma and Assam.

S. curvifolium.—(Plate). A small plant with narrow, curved leaves. Flowers red and orange, on a short erect spray. Hanging pot. Burma.

VANDA.

Also an evergreen class, very similar in growth to the Aërides and Saccolabium. They need plenty of light, and at the end of the cold season should be exposed to direct sunshine for some hours during the day until they bloom. They should have liberal water during the dry weather, but never when the sun is on them; and care must be taken not to allow water to lodge in the heart of the plant.

V. Roxburghii.—(Plate). Stem erect about a foot in height, covered with thick leaves, which grow in pairs up the stem. Flowers on a spray. There are three varieties, *viz.*, unicolour, flowers dull greenish-brown, white on the outside; another, pale green with lines of olive brown and either purplish-blue or pink lip; and a third which has greenish white flowers with waxy white lip, and is sweet scented. The last is rare.

Miniature tree. Lower Bengal, where the first two sorts are common.

V. cœrulea.—A noble plant, native of Assam. Fine specimens have an erect stem two or three feet high, with stiff, shortish, leathery leaves. Flowers on an erect stalk 10 to 15 in number, colour white and blue. Grow in pot.

V. cœrulescens.—(Plate.) A small variety, with dark green strap-like leaves, five to seven inches long. The flower spike is stout and long, and bears a quantity of blossoms of purplish blue colour. There is a variety of this Orchid named V. cœrulescens Boxallii —a more slender plant, with flowers delicate French grey and light blue. Grow in hanging pot. Natives of Burma.

V. vipani.—A large rampant Orchid with thick fleshy leaves. Flowers, in a small bunch, yellow and brown and smelling strongly of ripe apples. This Orchid is useful on account of its massive evergreen foliage. Grow on block. Native of Burma and Chittagong.

V. Denisoniana.—Erect stems, bearing a few longish, thin, curved, dark green leaves at the top. Flowers three to six on a spike, waxy white just tinged with green. Very

sweet scented and lasts a long time in beauty. Grow in pots. Burma.

V. gigantea.—A plant with large pendant glossy dark green leaves. Flowers three inches across on a short stem, colour golden yellow marked with irregular red rings and lip white. This Orchid needs plenty of water, and must have direct sun during February and March, or until it blossoms. Grow on block, near the roof. Burma.

V. teres.—(Plate). A large straggling plant, the leaves of which are cylindrical and resemble green twigs about the thickness of a small quill. The best way to grow this variety is, just before the rains set in, to cut off the growing tops of the plants about eight inches in length and plant five or six of them in a hanging pot or basket. The flowers are very large and showy, colour rosy white, with lip rose and orange. This Orchid also wants direct sunshine as the hot season approaches. Native of Assam, the Terai, Chittagong and Burma. A beautiful variety, bearing large massive sprays of blossoms of superb colour, is found near Port Blair in the Andaman Islands.

V. tricolor.—A native of Java; a very

desirable variety and one which thrives admirably in the Calcutta Conservatories. It is free growing, with tall straight stems, and curved leaves. Flowers fragrant, colour pale yellow, spotted with dark red, the middle of the tri-lobed lip being rosy magenta. There are several varieties, differing only in the colour of the flowers. Grow in pots.

CŒLOGYNE.

This genus is one of the commonest in India, but unfortunately the majority of the kinds found in low levels and calculated to thrive in the Conservatory, have small, insignificant flowers. The finest of the whole class is C. cristata, a Plate of which is given; it will serve the amatour collector in identifying the class to which he will find many fresh importations from the jungle belong. In some kinds the bulbs grow clustered together; and in others apart from one another, on a creeping root-stalk. Each bulb has two leaves on the top, which are evergreen. The flowers are borne in a spray. C. cristata is, unluckily for dwellers in the plains, a high level Orchid, and flourishes at an elevation of between 8,000 and 9,000

feet, above Darjeeling and elsewhere in the Himalayas; it has flowers three or four inches across, pure white with a blotch of yellow on the lip. Cœlogynes are best grown in pots, and require plenty of water during the season of growth. The following are worth cultivating, and will succeed in the plains.

C. ciliata.—Pseudo-bulbs about four inches high, leaves light green ; flowers in a spray, white and yellow with brown markings. India and Burma.

C. fuscescens.—Pseudo-bulbs elongated, about three or four inches high, with two broad, oblong leaves growing from the top. Flowers five or more in a spray, brownish green, with four cinnamon coloured spots in the lip. India and Burma.

C. Gardneriana.—Pseudo-bulbs flask-shaped and dark green, with broadish lance pointed leaves, whole plant about a foot high. Flowers, on a long drooping spray, appears but half opened; colour white, with yellow and brown lip. Khasya Hills, Nepal and Burma.

C. Messangeana.—Pseudo-bulbs three or four inches high, with two leaves at the

top. Flowers in a long spray light yellow, with brown, yellow and white lip. Assam.

CYMBIDIUM.

Generally found in masses, in the forks of large trees. They have a profusion of long narrow evergreen leaves, most varieties are bulbous. C. aloifolium is a very common kind; flowers, in a pendant spray, dull chocolate brown; on account of the foliage, a plant or two will be found ornamental in the Conservatory. This genus should be grown in pots.

C. eburneum.—(Plate). One of the finest; erect flower spike six inches high; flowers large, ivory-white, with yellow in the lip and sweet scented. Assam and Burma.

C. Masterii.—Same form as C. eburneum; erect flower spike, but colour white with yellow centre and lip spotted with rosy purple; almond-scented. India.

C. pendulum.—Large growing, with leathery, furrowed leaves. Flower spray pendant; colour yellowish olive tinted, with lip white, yellow and red. Sylhet.

C. Lowianum.—Drooping flower sprays, flowers, four inches across, yellowish-green and brown, with lip cream coloured and

having a large maroon blotch. India and Burma.

THUNIA.

This genus supplies three or four varieties which succeed in the plains. The stems are round and jointed and with a tendency to grow erect. The stems lose all their leaves during the dry season, and as the rains begin, new stems shoot up, bearing leaves in pairs all the way up; as soon as the new stems arrive at maturity, they send out a mass of drooping flowers at the top, which bends gracefully downwards with their weight. Grow in hanging pots, or if the mass be a large one, in a common pot.

T. alba.—(Plate). Plant about two feet high; sepals and petals white, lip white pencilled with purple and lilac. India and Burma.

T. Bensoniæ.—Plant about a foot high, blossoms two or three inches across; colour magenta, with purple and yellow lip. Burma.

T. nivalis.—Like T. alba, but the plant is somewhat smaller and the flowers are pure white. Sylhet.

PHALÆNOPSIS.

In this genus are found several of the most lovely tropical Orchids. The plants are compact, and small as compared with the size and number of the blossoms. The leaves are generally broad and fleshy, grow close together and are few in number; and the roots are profuse and also fleshy. Plates (adapted from Williams *Orchid Growers' Manual)* are given of a Phalænopsis "at Home" and of a Phalænopsis established in a hanging basket. These plates will give a better idea of the form of most of the genus than written descriptions. Hanging baskets are the best for them, though hanging pots are often used. They require liberal watering in the season of growth; and in the dry season more water (which should be applied to the roots chiefly, little being given to the leaves) than other varieties, as the leaves are sure to fall if the plants get quite dry; and for this reason they should never be exposed to direct sunshine, though they require plenty of light and moist heat. In Calcutta it has been found an excellent plan to grow them suspended over a tank, or metal trays, kept full of water.

P. amabilis.—Termed "the Queen of Orchids;" has long drooping sprays of flowers, white, with pink and yellow markings and spots in the lip. Java and Philippine Islands.

P. Schilleriana.—(Plate). A large growing variety, with leaves up to 18 inches in length, dark green, mottled with streaks of grey on the upper side and purple underneath. Roots are flat. Flowers in a pendant spray, large and varying in colour from white, tinged with mauve, to distinct mauve, with yellow and reddish brown markings in the lip. Philippine Islands.

P. Lowii.—A small plant, which in its native jungles, in Burma, generally loses all its leaves in the dry season. Flowers purple and white and very large compared with red size of the plant. Several plants together, established round the sides of a basket, form a lovely object when in flower. In the dry season, this Orchid should not be too liberally watered.

P. cornu-cervi.—(Plate). In a fine specimen the leaves are some eight inches long, of a light, bright green. The flower spike is branched and resembles a stag's horn, hence the name. The flowers are greenish-yellow barred with red. Burma.

P. Manii.—Like P. cornu-cervi, but the leaves are edged with violet and spotted with violet near the base, flowers yellow spotted with brown, lip whitish, striped with purple. Assam.

P. Sumatrana.—Flowers pale yellow barred with reddish brown with purple lines in the lip. Sumatra.

P. grandiflora.—(Plate). Similar to P. amabilis, but the flowers are larger and the lip yellow and white. Java and Borneo.

P. tetraspis.—Flowers are pure waxy white and sweet scented. Andaman Islands.

FOREIGN EPIPHYTAL ORCHIDS.

A large number of foreign Epiphytal Orchids can be succesfully grown in the Indian Conservatory. Many varieties can be procured from Mr. S. P. Chatterji, the enterprising and well-known florist at Calcutta. If plants are imported from Orchid growers at Home, they should be despatched so as to arrive in India about the end of May;—except in the Upper Provinces, where hot winds prevail, when they should not reach destination until the rains have fairly set in.

The following classes are recommended to the Indian amateur.

Angræcum.—Noble plants, resembling Aërides. Natives of Tropical Africa. New Guinea, Zanzibar and Madagascar.

Barkeria and Burlingtonia.—In form like Cœlogyne. Tropical America.

Cattleya.—Pseudo-bulbs generally club-shaped, with one or two leaves on the top; flowers large and handsome. William describes upwards of 150 varieties of this class in cultivation at Home, most of which are natives of Tropical America.

Lælia.—Very like Cattleya. Tropical America.

Oncidium.—Pseudo-bulbous, evergreen, with attractive flowers. O. papilio, the butterfly Orchid, is a charming thing and thrives well in Calcutta. Tropical America.

Stanhopea.—A singular class of tropical American Orchids. Pseudo-bulbous with large richly-coloured flowers.

Zygopetalum.—Pseudo-bulbous, evergreen and large growing, with spikes of handsome flowers. Tropical America.

CHAPTER VIII.

TERRESTRIAL ORCHIDS.

The lower hills of India and Burma are rich in Terrestrial, or ground Orchids,—but comparatively few of them are known and cultivated at present, chiefly because they usually blossom in the rains, when their habitat is unhealthy, and jungle-hunting difficult; and as the leaves often die down in the dry season, when the hills are more easily accessible, the plants cannot then be descerned.

As the various species require different treatment, no general rules can be laid down as to culture. The proper mode of cultivation will therefore be combined with the descriptions given below.

CYPRIPEDIUM.

The popular name for this genus is "Our Lady's Slipper," on account of the lip being shaped like an oriental slipper, bag-shaped, not pointed, at the toe. The plants have

short stems, from the top of which spring several thick leaves. The flower spikes are erect and the blossoms curious and interesting. A few are really Epiphytal in their native forests, but in India they are all cultivated potted in soil. They want liberal watering during the season of growth (the rains); and in the dry season the roots should always be kept moist. Numerous new sorts have been introduced at Home by hybridizing. There is a considerable cold climate section, which could be grown as pot plants in our Hill stations. The best soil for them is three parts leaf mould, two parts charcoal in lumps, one part coarse sand, one part finely chopped cocoanut husk (coir). The roots only should be potted, and the stem of the plant should be raised a little in the centre of the pot. Hanging or ordinary pots can be used at pleasure.

C. concolor.—(Plate). Small plants, variegated leaves purple beneath, four inches long. Flower stalk purple. Flowers yellow, spotted with red. This plant requires a very little slaked lime added to the soil. Burma.

C. Druryi.—Thick leaves about nine inches long and one and a half broad. Flower stalk hairy; flowers greenish yellow

and purple, with pale yellow, spotted, lip. South Travancore.

C. Fairrieanum.—Flowers white, purple and green. Assam.

C. Hirsutissimum.—(Plate.) Pale green leaves a foot long. Flower stalk and back of the flowers hairy. Flowers purple and green. Bhootan and Assam.

C. insigne.—Small growth; leaves dark green mottled with yellowish green. Flowers yellow, green and purple. Sylhet and Khasya.

C. pardinum.—Mottled leaves, purple underneath; flowers white, green and purple, and lip pale yellow with green veins. Assam.

C. Spicerianum.—(Plate). Plant resembles C. insigne in appearance; leaves dark green spotted with purple. Flower stalk purple and hairy. Flowers two to three inches in diameter, white, pale green and purple, with purple lip. Assam.

C. venustum.—Leaves light and deep green mottled, underneath mottled with purple; flowers greenish, white and purple, lip yellowish, veined with green and flushed with purple. Sylhet.

ANŒCTOCHILUS.

A genus of small plants, two to six inches high, found generally in shady ravines and

valleys in hilly localities, where there is constant humidity. Their flowers are small and unattractive, but the leaves are perfect gems of loveliness, varying in colour through different shades of red, brown, bronze and green, and often veined with a delicate net work of gold and silver. The stalks and leaves are somewhat fleshy. They should be grown in a mixture of coarse sand and leaf mould, in equal parts, mixed with a little charcoal in fine nodules, and good drainage at the bottom. At Home they are grown under bell glasses; but in India this is only necessary in dry localities. In places where the atmosphere is always moist, they will thrive if treated as follows:—Pot them in small pots, which should be sunk in other pots two or three sizes larger; the large pots should be filled round with common soil and kept in a saucer of water. The plants should be placed in the shade and out of the way of draughts and currents of air.

A. Boylei.—Leaves two inches long and two inches broad. Colour light and dark green mottled, with veins of gold. India.

A. concinnum.—Dark olive green with coppery red net work. Assam.

A. Heriotii.—Leaves three and a half

inches long by two and a half broad. Colour dark mahogany with golden veins. India.

A. hieroglyphicum.—A small variety, dark green leaves with silver grey blotches resembling hieroglyphics. Assam.

A. Roxburghii.—(Plate.) Plant three inches high, leaves two and a half by one and a half inches. Colour bronzy green at the margin, pale bright green down the middle, with coppery and golden veinings. India, Java and Singapore.

A. zebrinum.—Small variety, leaves deep olive green, with three copper coloured stripes. India.

Ceylon, Java and Borneo yield other varieties. An allied plant, Monochilus regium, differing only botanically in the flower, is highly prized, as being very distinct. The plant is about five inches high and the leaves dark green, with a broad band, pale lilac and whitish, down the centre. It is a native of Ceylon, where, Mr. Williams tells us, it is called Iri Rajah, or Striped King of the Woods.

ARUNDINA.

A. bambusæfolia.—(Plate). Is the only one of the genus found in India. It is an evergreen plant with reed-like stems three

to five feet high; leaves pale green; flowers, borne on a spike at the top of the stem, pale magenta rose, with rose lip striped with orange lines on each side of the throat, which is white.

CALANTHE.

Burma supplies us with the three varieties described below. They all have pseudo-bulbs two to five inches in length, covered with thin, grey, scale-like tissue. When the rains commence, the plants start into growth and the new bulbs send out green, ribbed leaves about a foot in length. The plants blossom at the end of the rains. The flowers are numerous, on a branching spray; after the plants have blossomed, watering should be stopped; and when the leaves are all dead, the bulbs should be put in a shallow box and kept in a godown till they show signs of starting (about the following April), when they should be potted as follows:—Fill the pot to within three inches of the rim with broken brick and charcoal, then spread out a layer of cocoa-nut fibre over the surface, and on it place two and a half inches of a mixture of equal parts leaf mould and lumps of charcoal, with a slight sprinkling of slaked

lime. On this place the bulbs, about four inches apart and between them fill in with some small lumps of brick and charcoal to the depth of half an inch. They require liberal watering in the growing season; but care should be taken, when the rains set in, that water does not *drip* from the roof on the leaves, as that will rot them. It is best to keep the plants on the Begonia stand under a pucca roof during the rains. (See Chapter II.) As these plants have very showy flowers, which last in beauty several weeks, they are well worth a place in the Conservatory, and the little extra trouble their cultivation involves.

C. vestita.—(Plate). Flowers white with either a yellow or red eye in the lip.

C. vestita rubro-oculata.—Flowers very large, white, with rich crimson blotch in the centre of the lip.

C. Turneri nivalis.—Flowers pure white.

LIMATODIS.

A small genus very like Calanthe Burma produces one variety, L. rosea, differing from the Calanthe in the shape and size of the bulb, which is elongated, jointed and pointed at the end, and in the colour so, the flower which is bright rose, with

pale yellow and crimson marks at the base of the lip. This plant should be treated the same as the Calanthe.

PHAJUS.

The name of this genus is sometimes written Phaius. These plants are large growing, in some varieties pseudo-bulbous; flower stalk has no leaves and bears sprays of large, handsome flowers. They should be grown in large pots in a mixture of equal parts of loam, leaf mould and well decayed cow manure. When growing, they need liberal watering at the roots, but William recommends that the water should not touch the young growth. They require very little water when at rest.

P. maculatus.—(Plate). Large oval pseudo-bulbs; leaves dark green, spotted with yellow; flower stalks two feet high; flowers yellow, the lip being edged with reddish brown. Northern India and Japan.

P. Wallichii.—Plant four or five feet high; oval pseudo-bulbs, which produce tufts of leaves; flowers orange yellow or buff, suffused with reddish purple. Sylhet.

Java, China, Australia and Madagascar produce other varieties.

VANILLA.

This is a well-known plant and deserves a place in our Conservatories, not only on account of its pretty, scented (though short-lived) flowers, but also for its interesting habit of growth and foliage. The plant has a thick green stem and fleshy green pointed leaves, which grow out at right angles to the stem. The Vanilla originally roots in the soil, but as it climbs up the support allotted to it (an inner post of the Conservatory serves for this very well), it sends out air roots. The kind which one usually meets with in India, and which supplies our flavouring essence, is V. planifolia, a native of America. V. Walkeri comes from Ceylon; V. Parishii from Burma; and V. phalænopsis, which bears large bunches of gorgeous bluish-white, rose and orange coloured flowers, is a native of Madagascar.

The plant should be potted in a largish pot, in a mixture of loam, leaf mould and a little sand, with good drainage below.

FOREIGN TERRESTRIAL ORCHIDS.

The following Foreign Terrestrial Orchids are calculated to thrive with us. They should be imported in soil, in Wardian

cases;—and should arrive just as the rains are beginning.

Bletia.—Pseudo-bulbous, flowers rich coloured. Tropical America, China and Japan.

Ipsea.—Roots tuberous. Ceylon produces a fine variety with rich orange coloured flowers, called I. speciosa.

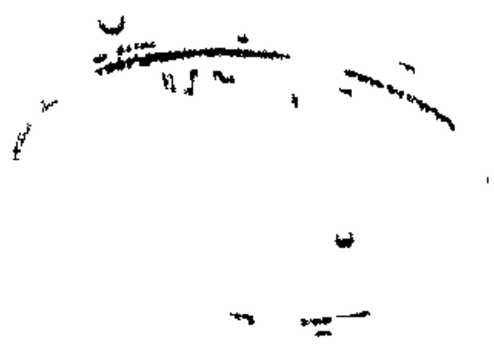
Lissochilus.—Handsome Orchids approximating the Phajus species in form. Tropical Africa.

Peristeria.—Pseudo-bulbous, large growing and handsome, natives of Central America. P. elata, the Dove plant, or *El Spirito santo*,—so named from the resemblance of the centre of the flower to a dove,—is a magnificent Orchid; it does well in Calcutta and other Indian stations, and should be in every amateur's collection.

Physurus.—Closely allied to the genus Anœctochilus, and cultivated for the sake of their charming variegated, metallic foliage. Tropical America.

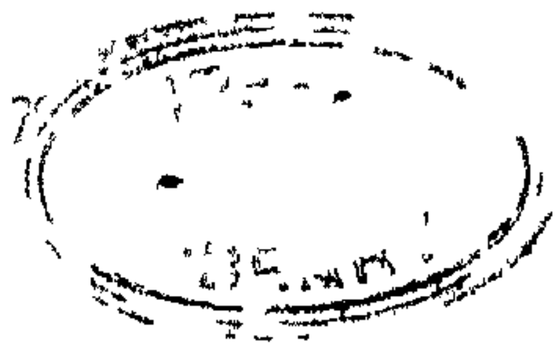
I.

AËRIDES CRISPUM.



AËRIDES ODORATUM.

AËRIDES VANDARUM



ANÆCTOCHILUS ROXBURGHII.

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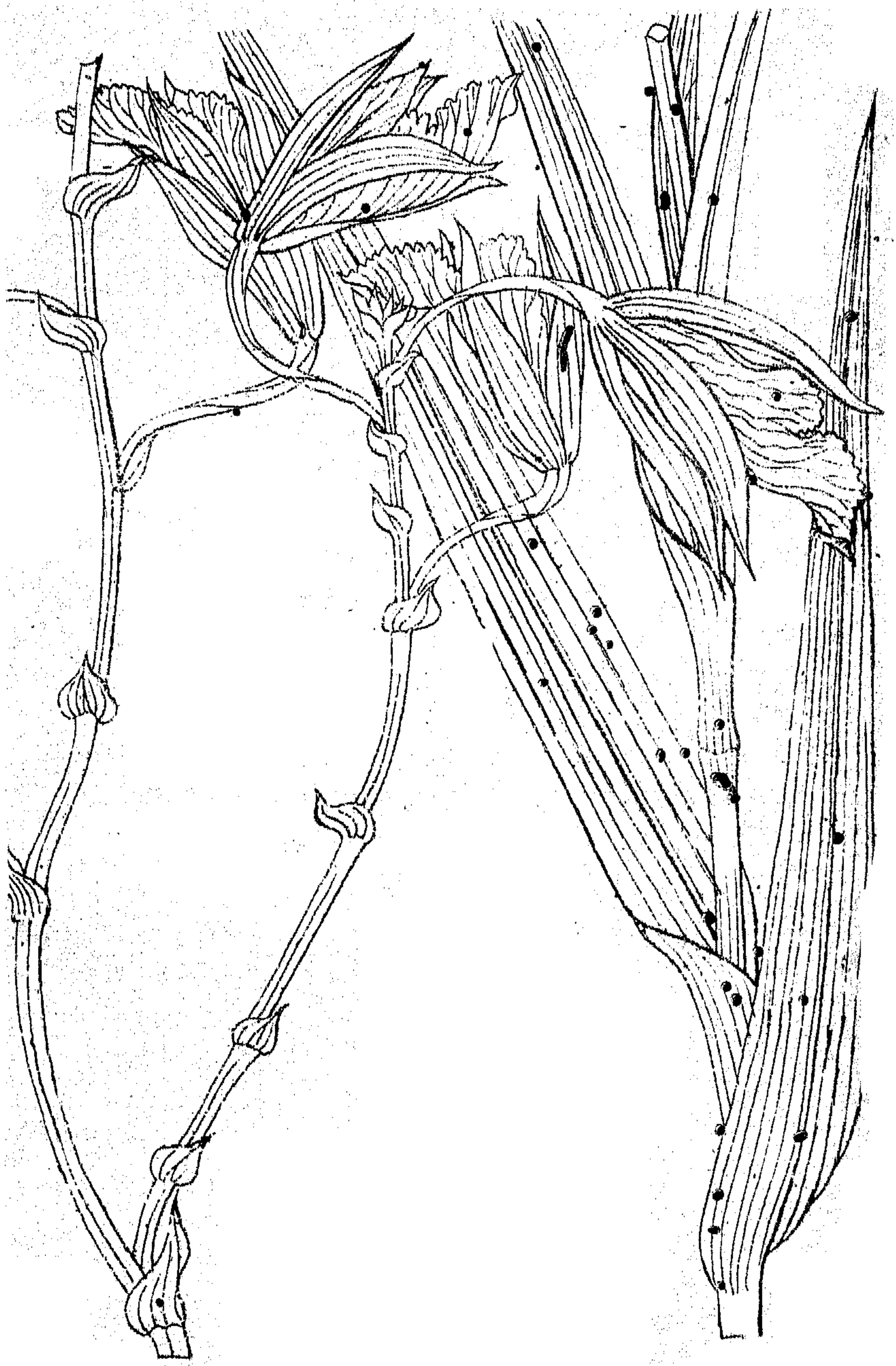

ARUNDINA BAMBUSÆFOLIA

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VI.

CALANTHE VESTITA.

A. CŒLOGYNE CRISTATA.

VIII.

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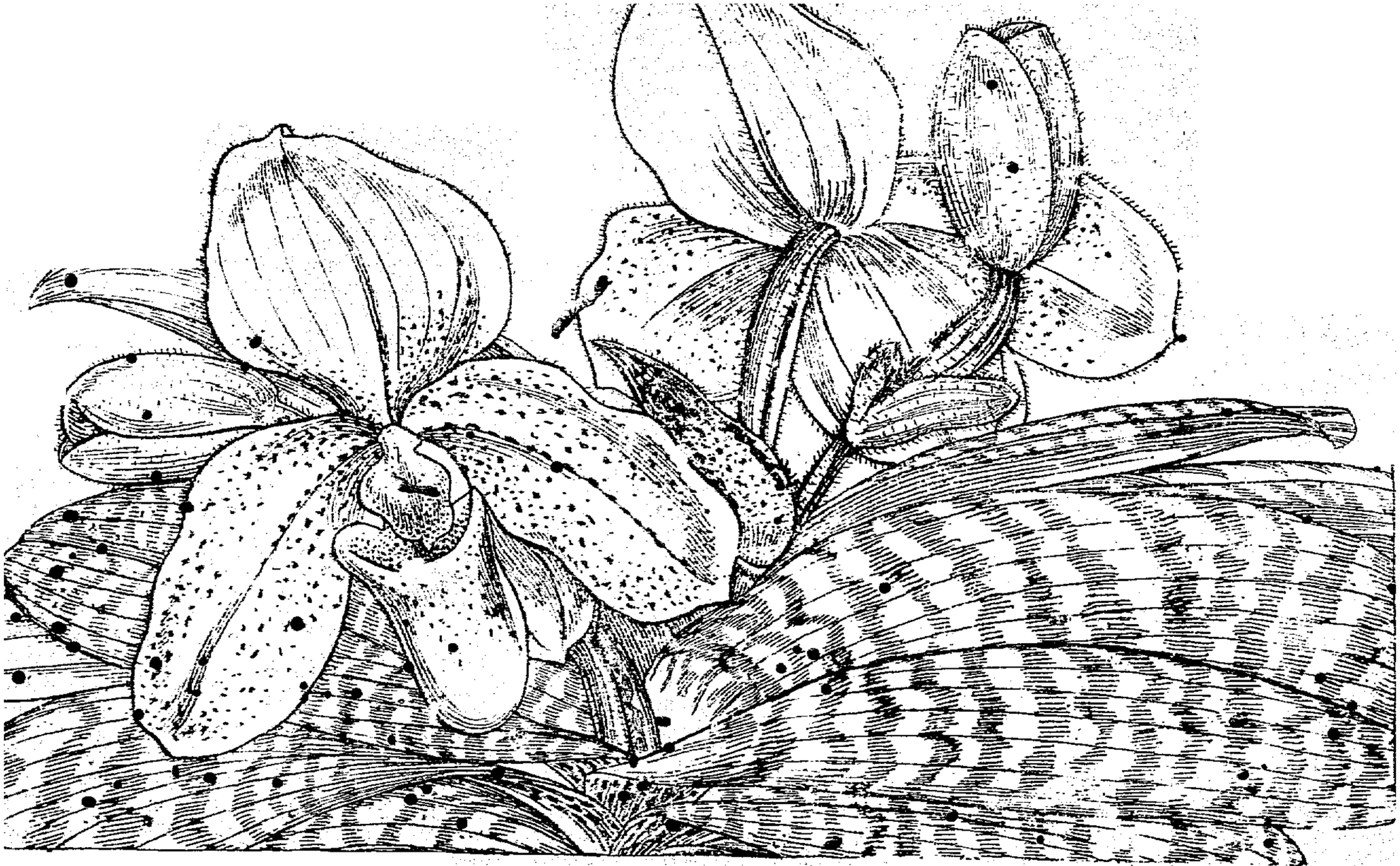
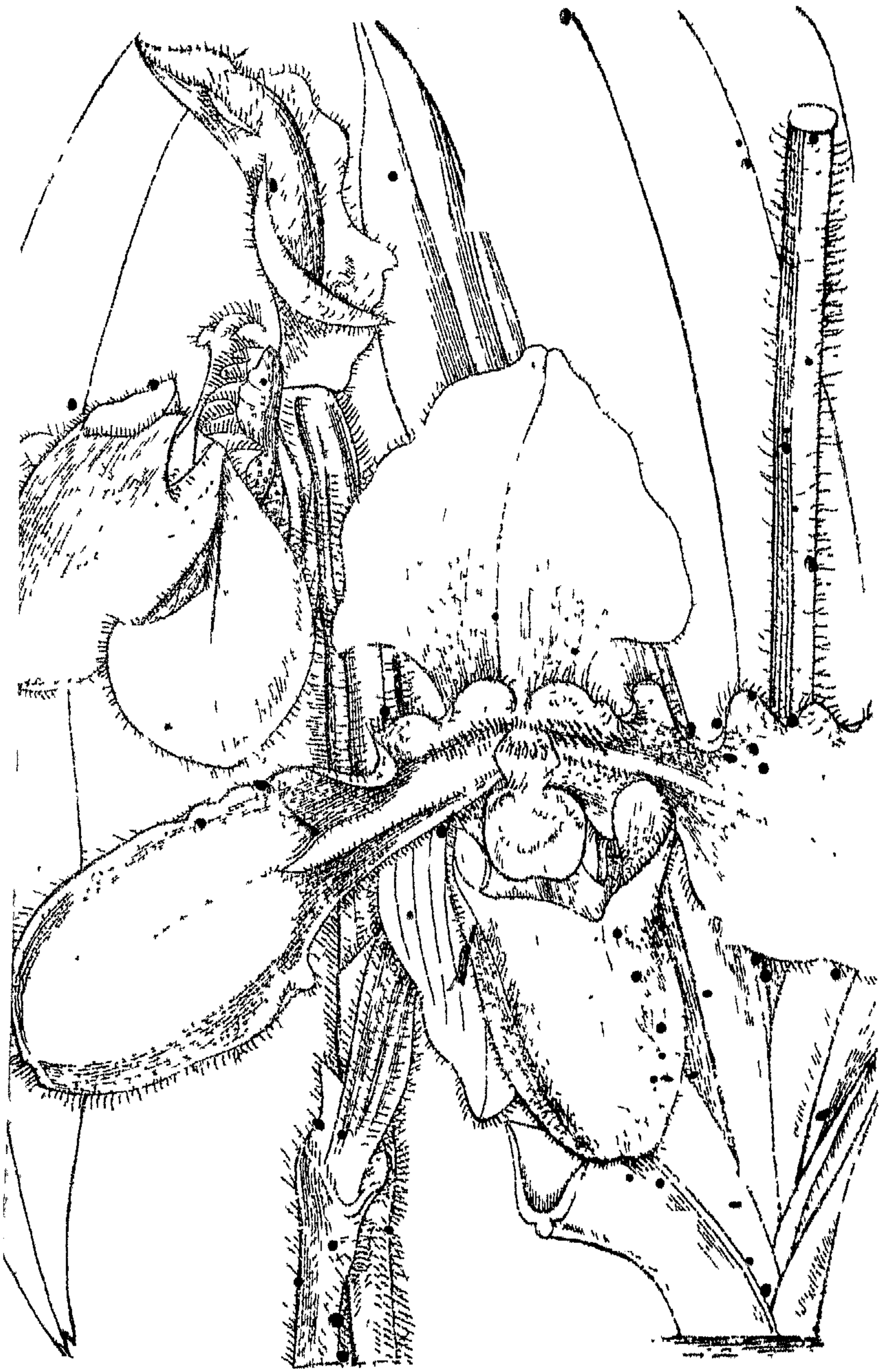
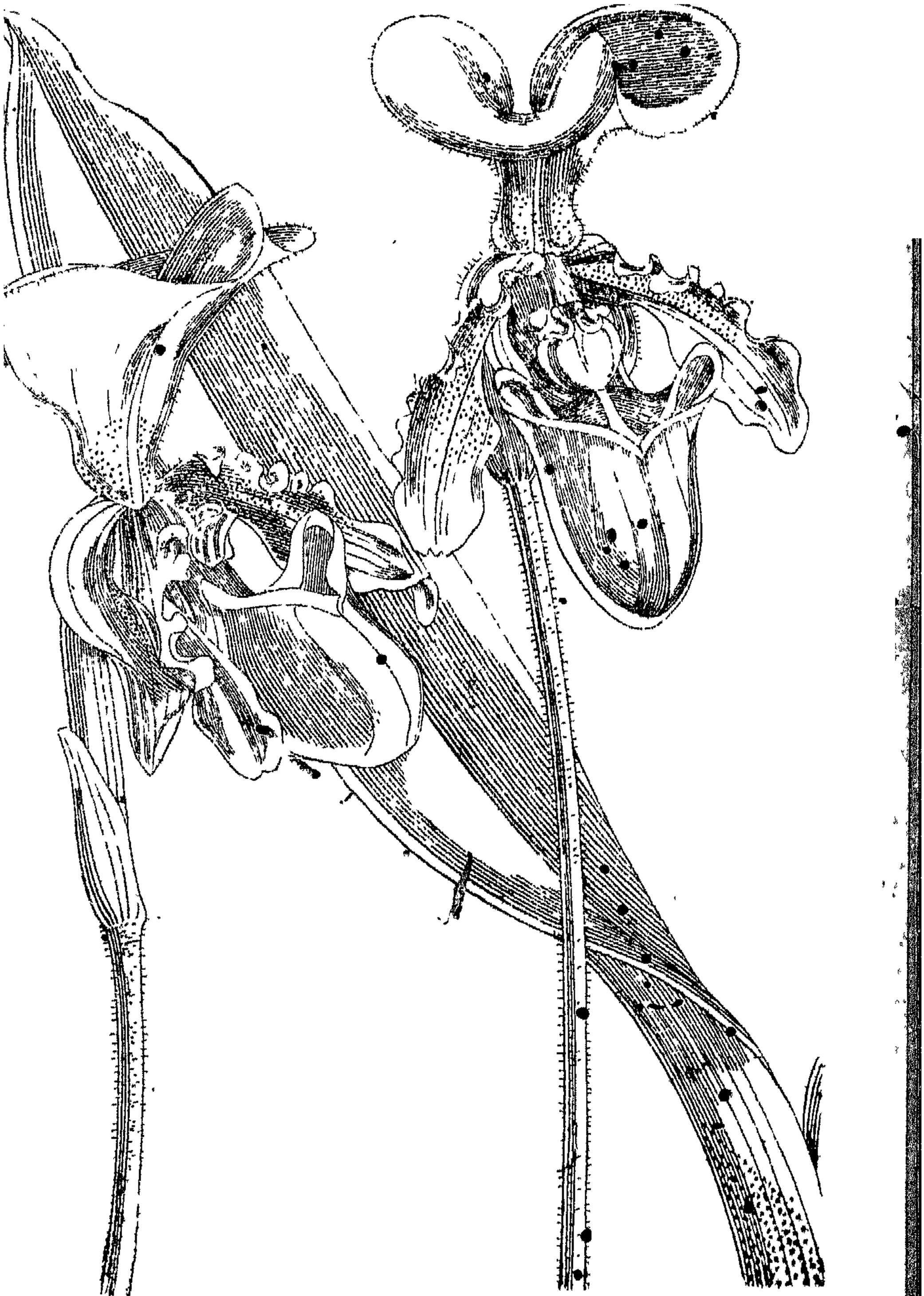


CYPRIPEDIUM CONCOLOR.

X.



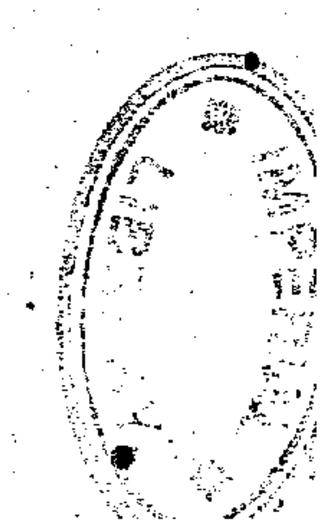
CYPREPIDIUM HIRSUTISSIMUM.



CYRPIPEDIUM SPICERIANUM.

XII.

DENDROBIUM AGGREGATUM.



DENDROBIUM BARBATULUM.

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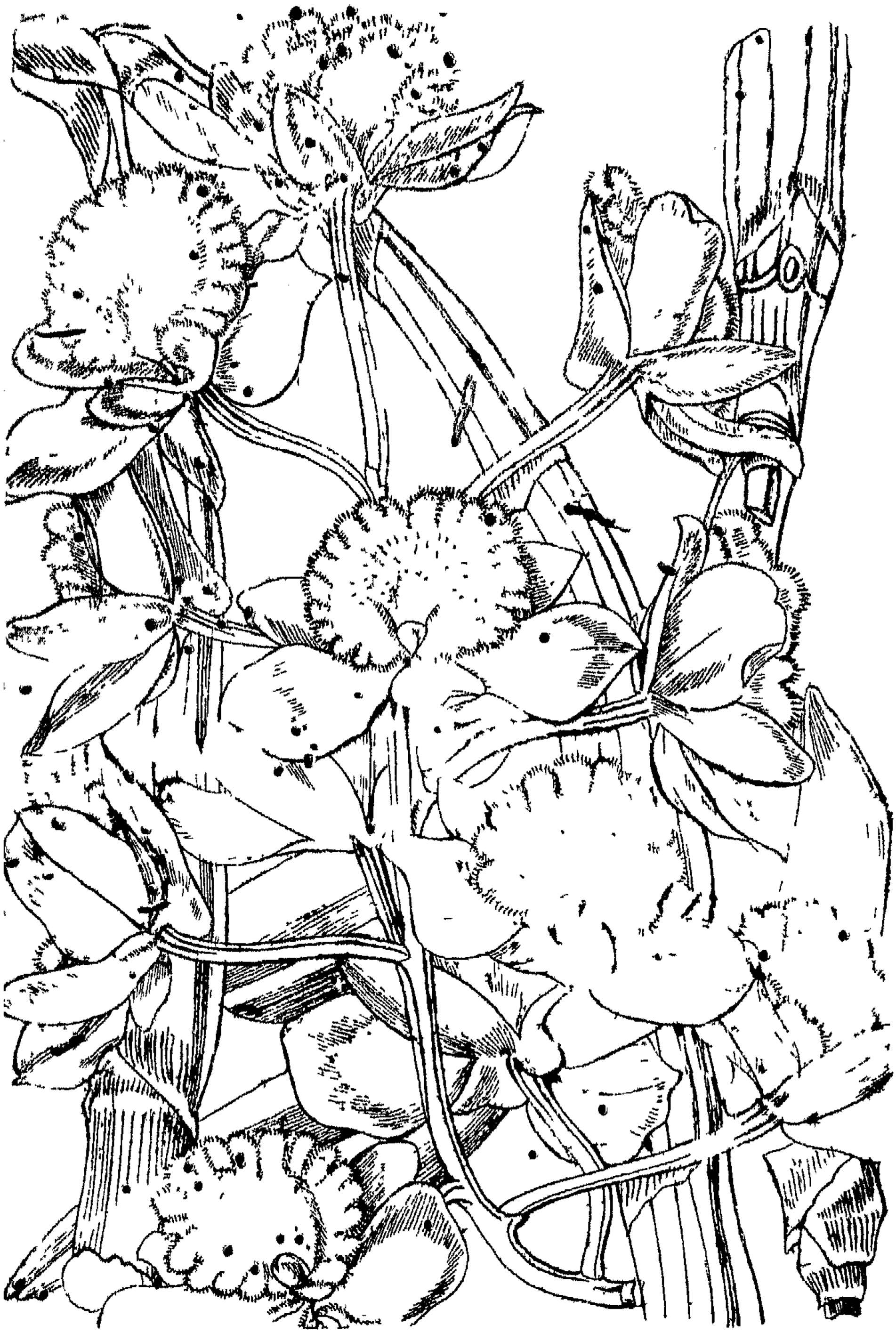
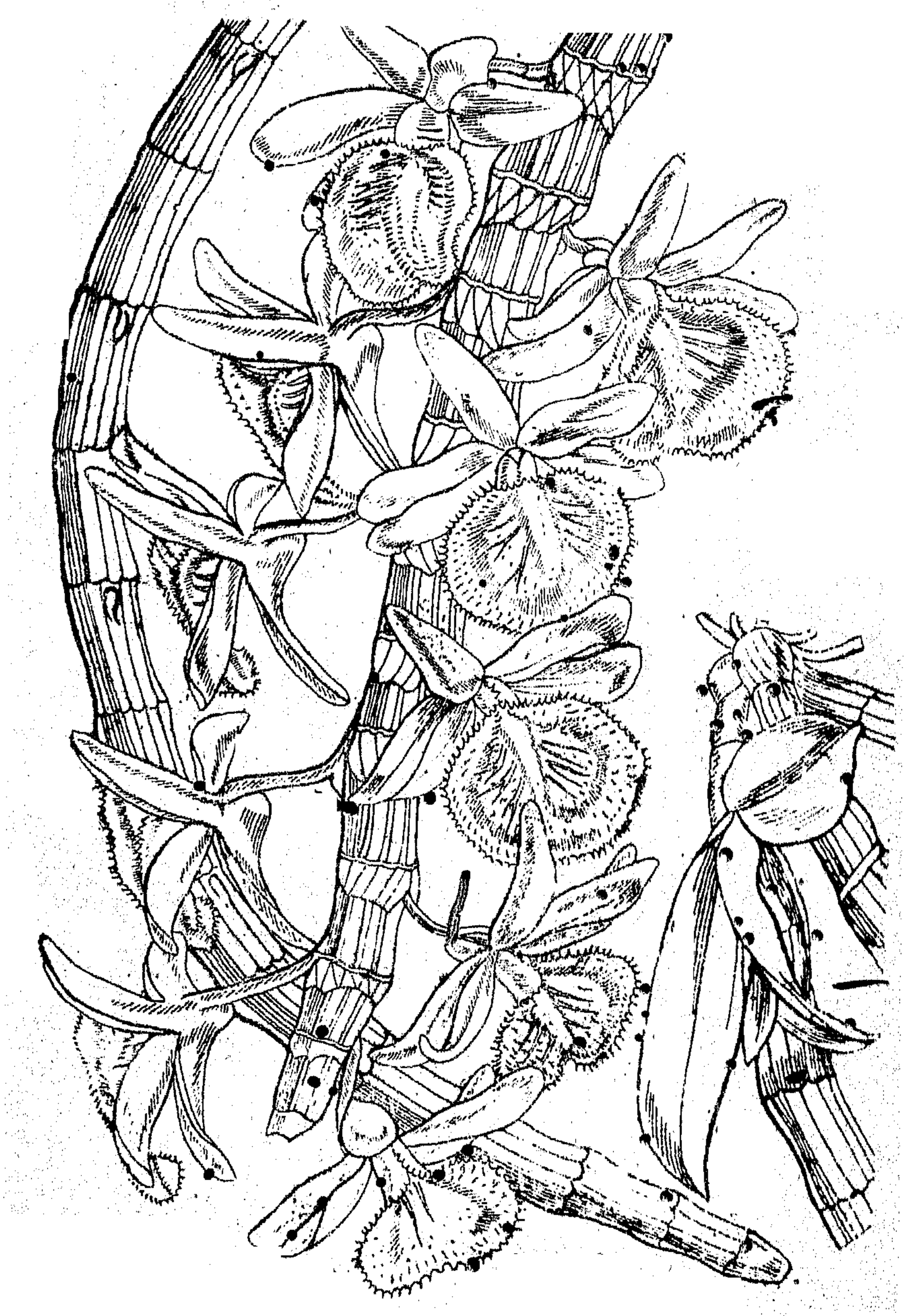


XLV.

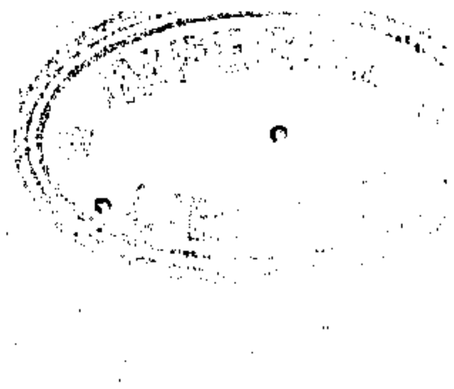
DENDROBIUM CHRYSOTOXUM.

DENDROBIUM CREPIDATUM.

XVI.



DENDROBIUM CRETACEUM.



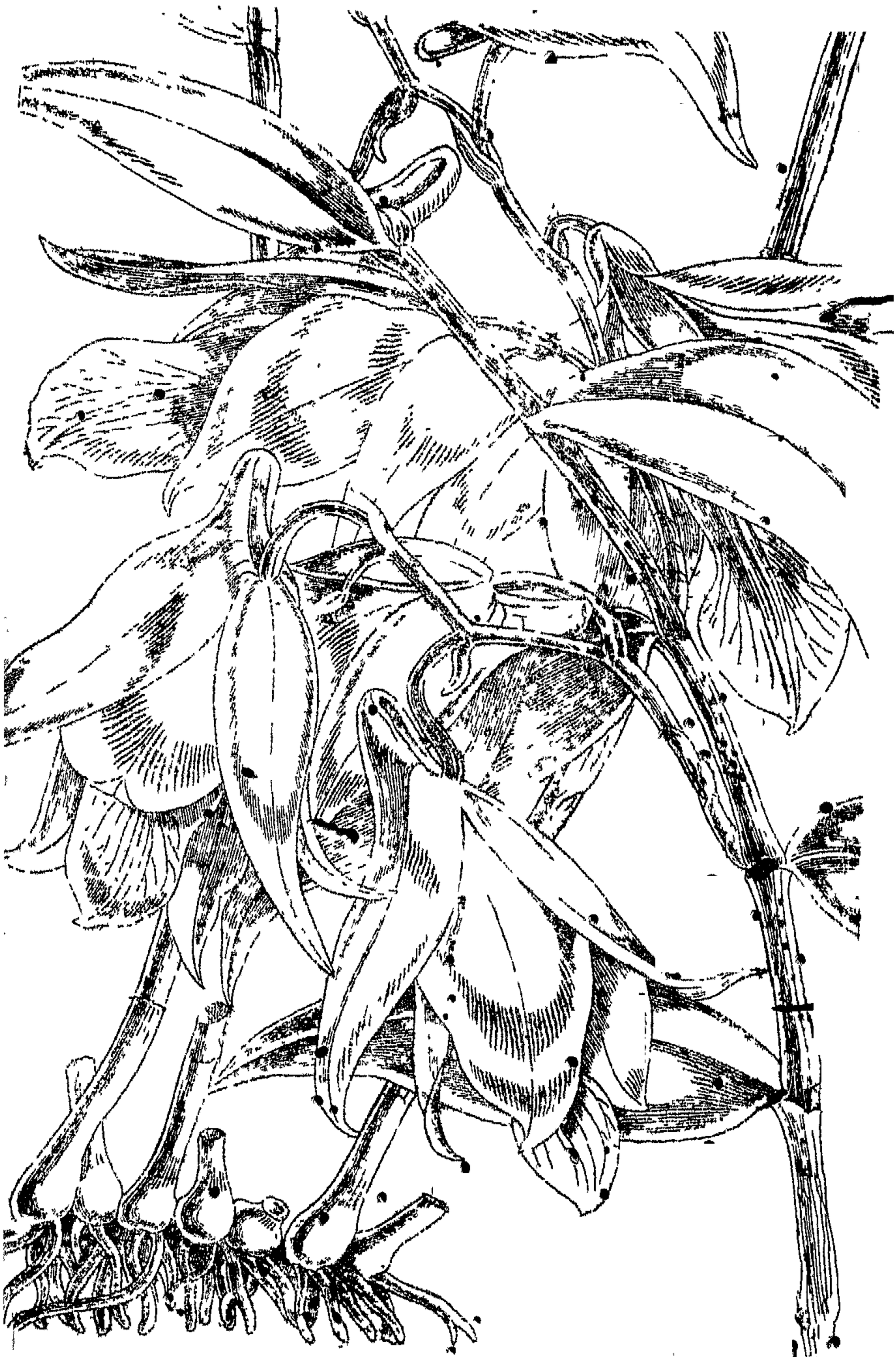
XVII.

DENDROBIUM FIMBRIATUM.

XVIII.

DENDROBIUM FYTOFIANUM.

XIX.



DENDROBIUM MCCARTHIÆ.

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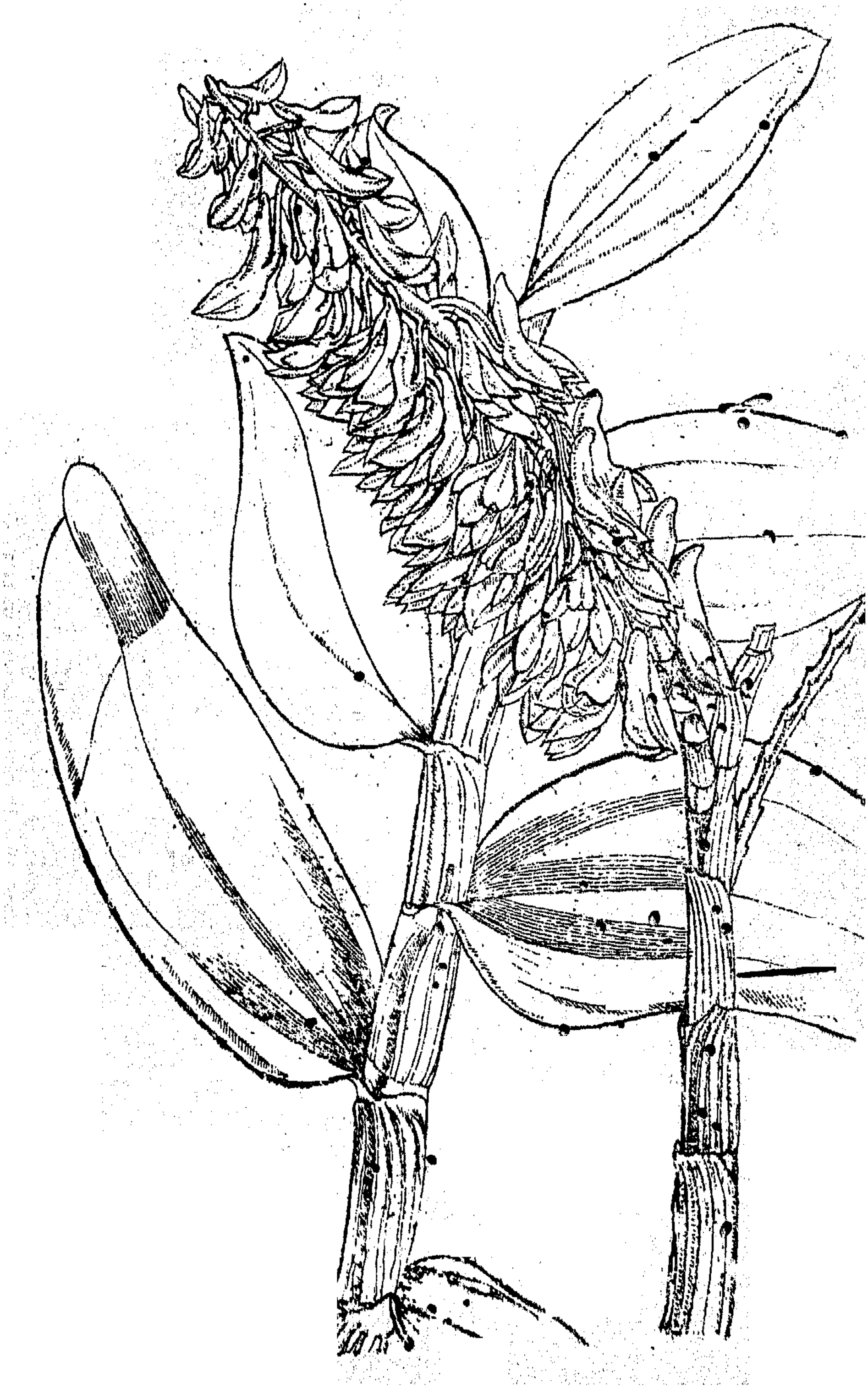
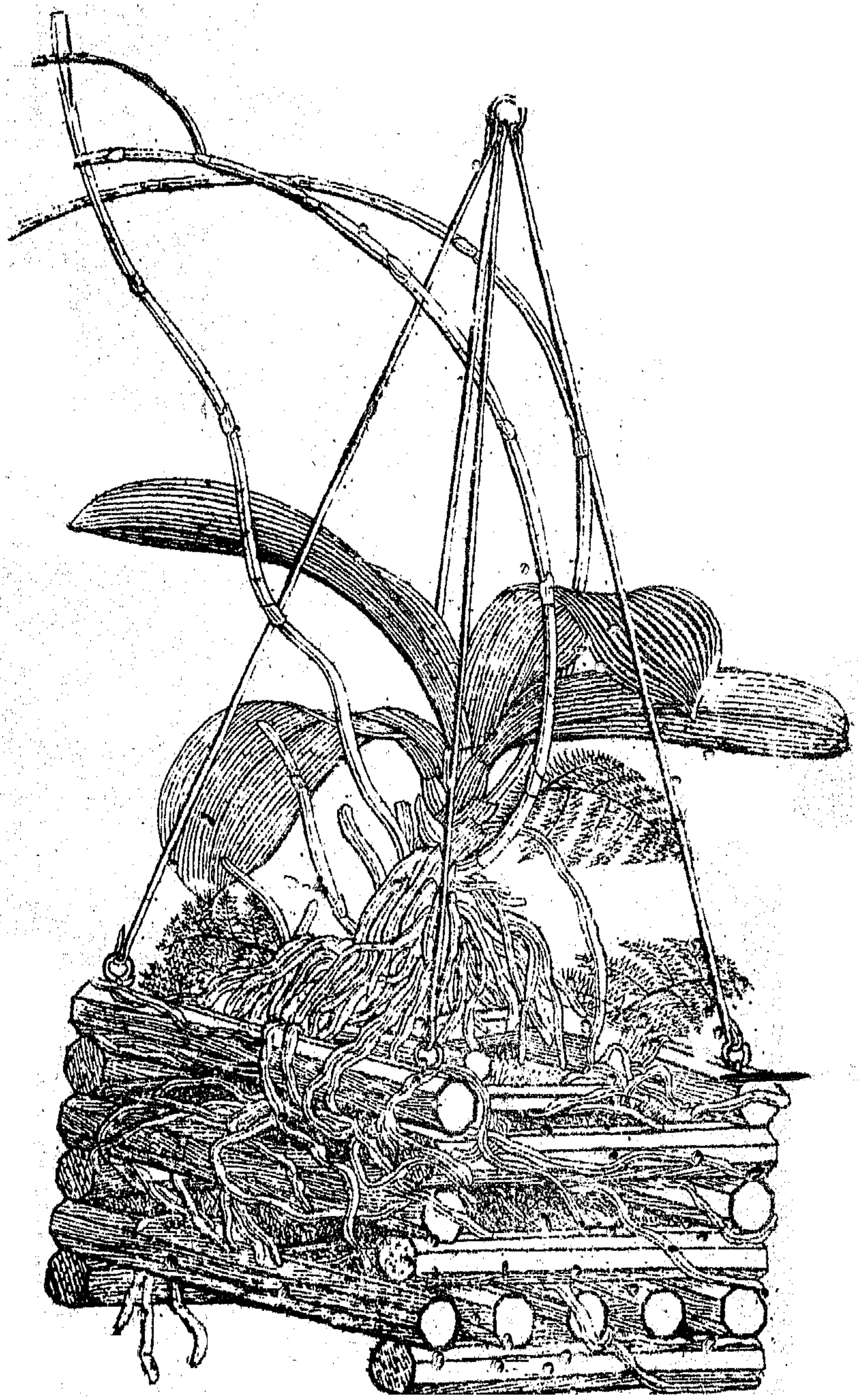


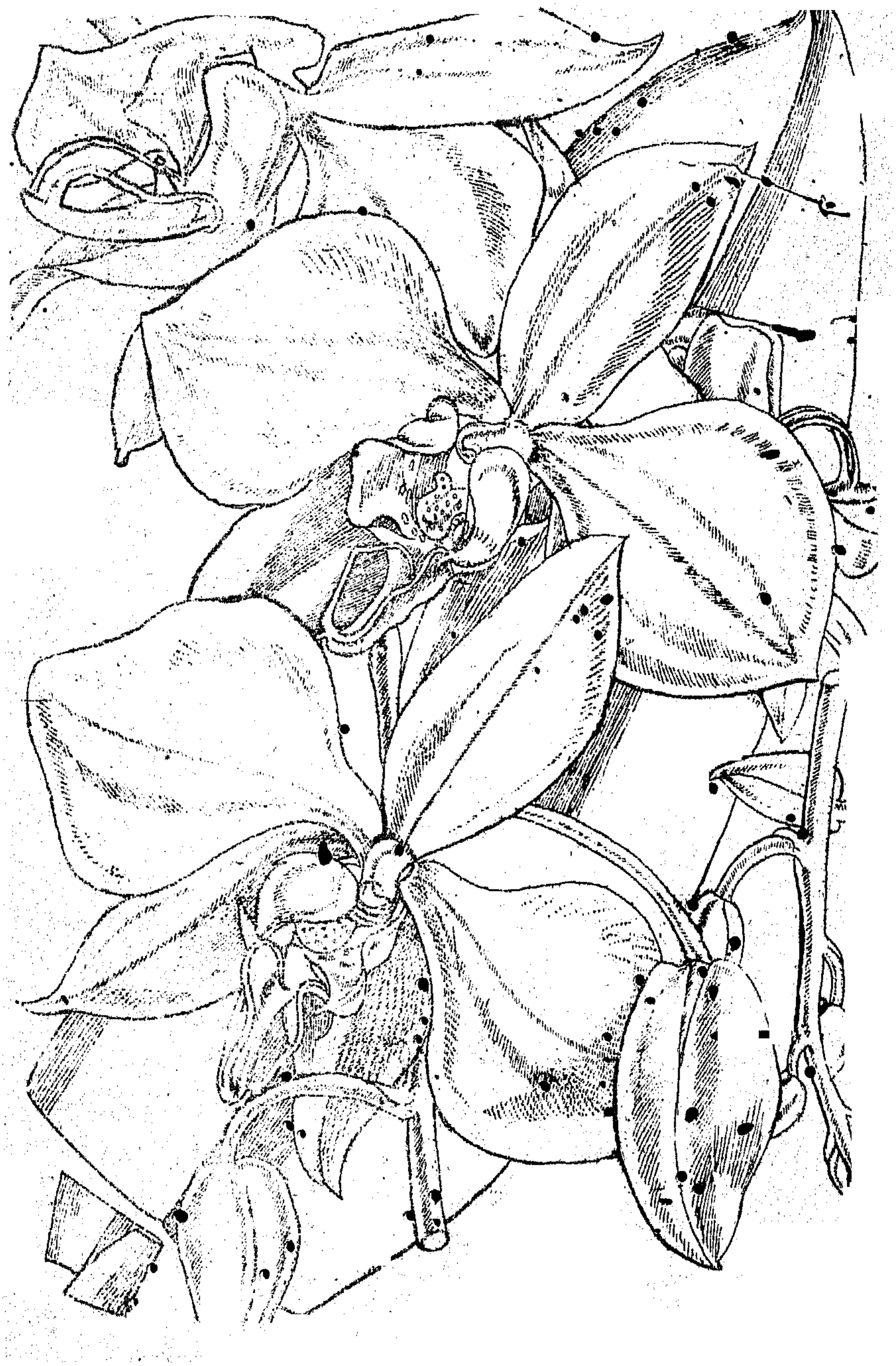
DENDROBIUM SUPERBIENS

PLATUS MACULATUS.



PHALÆNOPSIS IN BASKET.

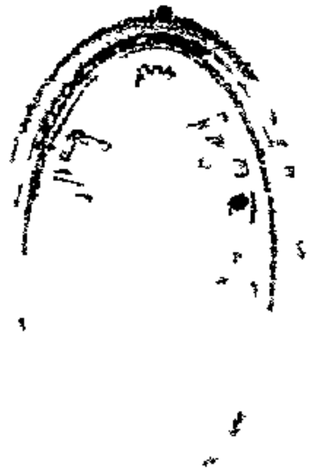
PHALENOPSIS. CORNU-CERVI.



PHALÆNOPSIS GRANDIFLORA.

XXVI.

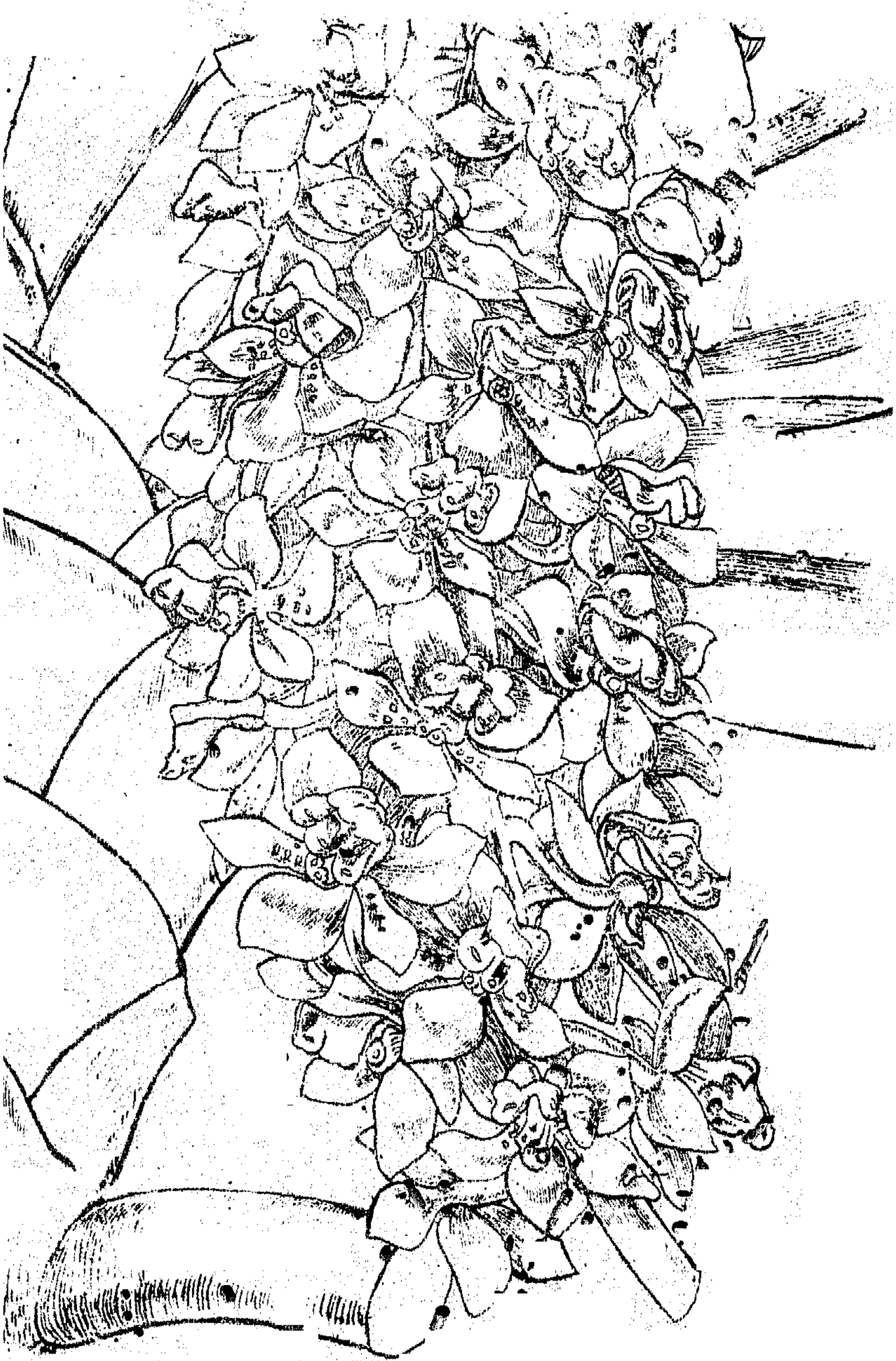
PHALÆNOPSIS SCHILLERIANA.



SACCOLABIUM AMPULACEUM.

SACCOLABIUM CURVIFOLIUM.

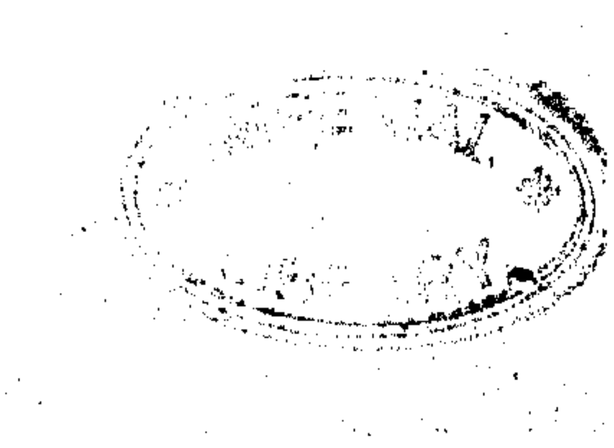
IMPERIAL
LIBRARY



ACCOLABIUM GIGANTEUM.

THUNIA ALBA.

VANDA CŒRULESCENS.



VANDA ROXBURGHII.

VANDA TERES.